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REGISTER, 1943-1944

ANNOUNCEMENT, 1944-1945

BETHLEHEM, PENNSYLVANIA

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1943

JULY

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1944

JANUARY

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JANUARY

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MARCH

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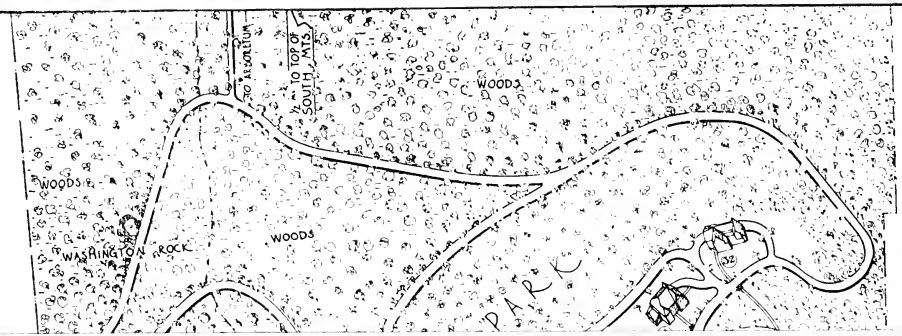
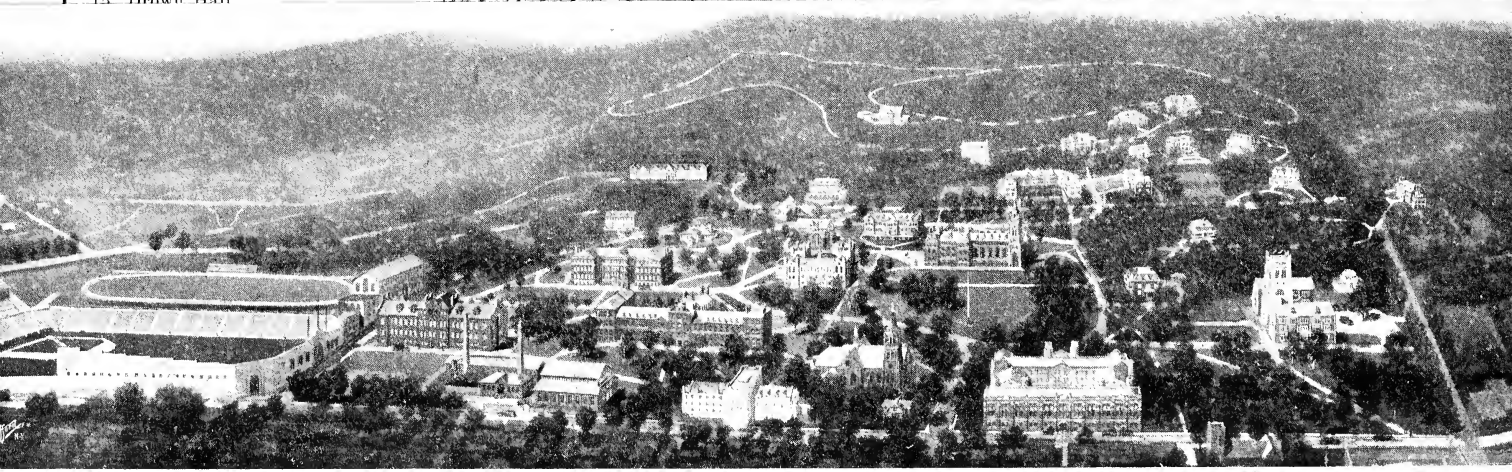
Map of the Campus of LEHIGH UNIVERSITY

1. Alumni Memorial Building
2. Packard Laboratory
3. Packer Memorial Chapel
4. Christmas-Saucon Hall
5. Fritz Laboratory
6. Shops
7. Power House
8. Physics Building
9. Chemistry Building
10. Williams Hall
11. Library
12. Mining Engineering
13. Coppée Hall
14. Armory
15. Drown Hall





Map of the Campus of LEHIGH UNIVERSITY

1. Alumni Memorial Building
2. Packard Laboratory
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4. Christmas-Saucon Hall
5. Fritz Laboratory
6. Shops
7. Power House
8. Physics Building
9. Chemistry Building
10. Williams Hall
11. Library
12. Mining Engineering
13. Coppée Hall
14. Armory
15. Drown Hall
16. Packer Hall
17. President's Home
18. Taylor Stadium
19. Taylor Gymnasium
20. Henry Reese Price House
21. Delta Tau Delta
22. Charles Lewis Taylor House
23. Sigma Nu
24. Delta Upsilon
25. Psi Upsilon
26. Phi Delta Theta
27. Theta Delta Chi
28. Beta Theta Pi
29. Alpha Tau Omega
30. Chi Psi
31. Phi Gamma Delta
32. Chi Phi
33. Sayre Astronomical Observatory
34. Charles Russ Richards House
35. Henry Sturgis Drinker House
36. Eugene Gifford Grace Hall

F. Faculty Residence

UNIVERSITY CALENDAR

1943–1945

1943

June 22, 23 (Tues.-Wed.).....Undergraduate registration
June 24 (Thurs.) .....Summer semester begins
June 24 (Thurs.) .....Six weeks summer session begins
August 4 (Wed.).....Six weeks summer session ends
August 7 (Thurs.).....Post-Session begins
August 19 (Thurs.).....Mid-semester reports
August 25 (Wed.).....Post-Session ends
September 25, 12:00 m. (Sat.).....Last day for filing applications for degrees to be conferred on Founder's Day
October 6 (Wed.) .....Instruction ends
October 7 (Thurs.).....Examinations begin
October 13 (Wed.).....Examinations end
October 18 (Mon.) .....Founder's Day
October 19, 20 (Tues.-Wed.).....Registration for Fall semester
October 21 (Thurs.).....Fall semester begins
November 25 (Thurs.).....Thanksgiving Day
December 16 (Thurs.).....Mid-semester reports
December 22, 10:00 p. m. (Wed.).....Christmas holidays begin
December 30, 8:10 a. m. (Thurs.)....Christmas holidays end

1944

January 15 (Sat.).....Last day for filing applications for degrees to be conferred at Midyear Commencement
February 9, 12:00 m. (Wed.) .....Instruction ends
Feb. 10 (Thurs.) .....Examinations begin
February 16 (Wed.).....Examinations end
February 20 (Sun.).....Midyear Commencement
February 22, 23 (Tues.-Wed.).....Undergraduate registration
February 24 (Thurs.).....Spring semester begins
February 24, 25, 26 (Thurs.-Sat.)....Graduate registration
May 15 (Mon.).....Last day for filing applications for degrees to be conferred on University Day
May 31 (Wed.).....Instruction for arts seniors ends
June 3, 5, 6, 7 (Sat.-Wed.).....Senior arts comprehensive examinations
June 7, 12 m. (Wed.).....Instruction ends
June 8 (Thurs.).....Examinations begin
June 14 (Wed.) .....Examinations end
June 18 (Sun.).....Baccalaureate Sunday
June 19 (Mon.).....University Day
June 21 (Wed.) .....Undergraduate registration
June 22 (Thurs.).....Summer Semester begins
June 22, 23, 24 (Thurs.-Sat.).....Graduate registration
June 22 (Thurs.).....Evening courses begin
June 26 (Mon.).....Six weeks summer session begins
August 5 (Sat.).....Six weeks summer session ends
August 7 (Mon.).....Post Session begins
August 17 (Thurs.) .....Mid-semester reports
August 26 (Sat.).....Post Session ends
September 25, 4:30 p. m. (Mon.).....Last day for filing applications for degrees to be conferred on Founder's Day
October 4 (Wed.).....Instruction ends
October 5 (Thurs.).....Examinations begin
October 11 (Wed.) .....Examinations end
October 15 (Sun.).....Founder's Day
October 18 (Wed.).....Registration for Fall semester

UNIVERSITY CALENDAR—Continued

1943–1945

October 19 (Thurs.) ..... Fall semester begins
November 23 (Thurs.) ..... Thanksgiving Day
December 14 (Thurs.) ..... Mid-semester reports
December 23, 12:00 m. (Sat.) ..... Christmas holidays begin

1945

January 2, 8:10 a.m. (Tues.) ..... Christmas holidays end
January 15 (Mon.) ..... Last day for filing applications for degrees to be conferred at Midyear Commencement
February 7 (Wed.) ..... Instruction ends
February 8 (Thurs.) ..... Examinations begin
February 14 (Wed.) ..... Examinations end
February 18 (Sun.) ..... Midyear Commencement
February 21 (Wed.) ..... Registration for Spring semester
February 22 (Thurs.) ..... Spring semester begins
April 19 (Thurs.) ..... Mid-semester reports
May 15 (Tues.) ..... Last day for filing applications for degrees to be conferred on University Day
June 6 (Wed.) ..... Instruction ends
June 7 (Thurs.) ..... Examinations begin
June 13 (Wed.) ..... Examinations end
June 17 (Sun.) ..... University Day

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Corporate Members

Eugene Gifford Grace, E.E., Eng.D., LL.D., Litt.D. ..... Bethlehem, Pa.

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Earle Frederick Johnson, C.E. ..... Detroit, Mich.

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Albert Nathaniel Williams, M.E. ..... New York, N. Y.

Thomas Sovereign Gates, Jr., A.B. ..... Devon, Pa.

Robert Edwin McMath, A.B., LL.B ..... Bethlehem, Pa.

Members Elected by Alumni

	Term Expires	
Andrew Edward Buchanan, Jr. Ch.E. Class of 1918	1944	Bridgeport, Conn.
Frank Anderson Merrick, E.E., Eng.D. Class of 1891	1945	Pittsburgh, Pa.
Walter Savage Landis, Met.E., M.S., ScD. Class of 1902	1946	New York, N. Y.
Alfred Van Sandt Bodine, M.E. Class of 1915	1947	Bridgeport, Conn.
Stewart Joseph Cort, Elmet. Class of 1906	1948	Sparrows Point, Md.
James Harvey Pierce, E.M. Class of 1910	1949	Scranton, Pa.

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EUGENE G. GRACE

Secretary and Treasurer
*WALTER R. OKESON
†JOHN IRVINE KIRKPATRICK
‡ROBERT SAYRE TAYLOR, SR.

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WALTER S. LANDIS

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ALAN C. DODSON — A. V. BODINE

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Committee on Endowment

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WILLIAM C. DICKERMAN — ALAN C. DODSON
WALTER S. LANDIS — ALFRED V. BODINE
CLEMENT C. WILLIAMS, *President of the University*
*WALTER R. OKESON, *Secretary*
†JOHN I. KIRKPATRICK, *Secretary*
R. S. TAYLOR, SR., *Acting Secretary*

* Died, November 4, 1943
† On leave of absence
‡ Acting

UNIVERSITY FACULTY

(The first date after the name indicates date of first appointment to continuous service on the faculty; the second date, when the first fails to do so, indicates the date of appointment to present classification as to professorial rank.)

CLEMENT CLARENCE WILLIAMS (1935) ..... *President*

B.S., Southern Illinois Normal School, 1900; B.S. in C.E., Illinois, 1907; C.E., Colorado, 1939; LL.D. (Hon.), Lafayette, 1935; Eng.D. (Hon.), Northeastern, 1936; Eng.D. (Hon.), Bucknell, 1937; Sc.D. (Hon.), Hahnemann Medical College, 1938.

PROFESSORS EMERITUS

THOMAS EDWARD BUTTERFIELD (1912, 1922) ....*Professor of Heat Power Engineering*

M.E., Stevens Institute of Technology, 1895; C. E., Rensselaer Polytechnic, 1897.

HOWARD ECKFELDT (1900, 1942) .....*Professor Emeritus of Mining Engineering*

B.S., Lehigh, 1895; E.M., 1896.

ROBERT WILLIAM HALL (1902, 1942) .....*Professor Emeritus of Biology*

Ph.E., Yale, 1895; B.A., Harvard, 1897; M.A., 1898; Ph.D., 1901.

PERCY HUGHES (1907, 1942) .....*Professor Emeritus of Philisophy*

A.B., Alfred, 1899; A.M., Columbia, 1902; Ph.D., 1904.

JOHN HUTCHESON OGBURN (1895, 1939) .....*Professor Emertius of Mathematics and Astronomy*

C.E., Vanderbilt, 1892.

HOWARD ROLAND REITER (1911, 1941).....*Professor Emeritus of Physical Education*

B.A., Princeton, 1898; M.A., 1900.

CHARLES LEWIS THORNBURG (1895, 1925) .....*Professor Emeritus of Mathematics and Astronomy*

B.S., Vanderbilt, 1881; B.E., 1882; C.E., 1883; Ph.D., 1884; LL.D. (Hon.), Lehigh, 1925.

HARRY MAAS ULLMANN (1894, 1938) ....*Professor Emeritus of Chemistry and Chemical Engineering*

A.B., John Hopkins, 1889; Ph.D., 1892.

PROFESSORS

HAROLD VICTOR ANDERSON (1918, 1941) .....*Professor of Chemistry*

B.Ch.E., Michigan, 1912; M.S., Lehigh, 1925.

ALLEN JENNINGS BARTHOLD (1939) ....*Professor of Romance Languages, Head of the Department of Romance Languages*

B.A., Lehigh, 1921; Ph.D., Yale, 1931.

PAUL LEVERNE BAYLEY (1927, 1937) .....*Professor of Physics*

B.A., Arkansas, 1913; M.A., Illinois, 1914; Ph.D., Cornell, 1923.

CLAUDE GILLETTE BEARDSLEE (1931) .....*Professor of Moral and Religious Philosophy, Head of the Department of Moral and Religious Philosophy, Chaplain of the University*

B.A., Yale, 1909; B.D., Hartford Theological Seminary, 1912; S.T.M., 1913; M.A., Southern California, 1922; Ph.D., Brown, 1931.

JACOB LYNFORD BEAVER (1917, 1931).....*Professor of Electrical Engineering, Acting Head of the Department of Electrical Engineering, Acting Director of the Curriculm in Electrical Engineering*

E.E., Lehigh, 1904; M.S., 1921; Sc.D., Harvard, 1932.

*LOYAL VIVIAN BEWLEY (1940) .....*Professor of Electrical Engineering, Head of the Department of Electrical Engineering, Director of the Curriculm in Electrical Engineering*

B.S. in E.E., Washington, 1923; M.S., Union College, 1928.

CHARLES CLARENCE BIDWELL (1927) .....*Professor of Physics, Head of the Department of Physics, Director of the Curriculm in Engineering Physics*

A.B., Rochester, 1904; Ph.D., Cornell, 1914.

FAY WARRINGTON BRABSON (1942) .....*Professor of Military Science and Tactics, Head of the Department of Military Science and Tactics*

B.A., University of Tennessee, 1901; Command and General Staff School, Ft. Leavenworth, 1907; M.A., Vanderbilt University, 1913; Army War College, 1925; Tank School, 1932; Col., U.S.A.

FREDERICK ALDEN BRADFORD (1926, 1935) .....*Professor of Economics, Head of the Department of Finance*

A.B., Michigan, 1921; M.A., 1923; Ph.D., 1926.

*ELMER CLARK BRATT (1929, 1941) .....*Professor of Economics*

A.B., Nebraska, 1925; A.M., 1926; Ph.D., Wisconsin, 1935.

RAYMOND COOLEY BULL (1923) .....*Director of Students' Health Service*

B.S., Colorado College, 1904; A.B., Kansas, 1906; M.D., Jefferson Medical College, 1909.

ALLISON BUTTS (1916, 1938) .....*Professor of Electrometallurgy*

A.B., Princeton, 1911; B.S., Massachusetts Institute of Technology, 1913.

ALFRED COPELAND CALLEN (1939) .....*Professor of Mining Engineering, Head of the Department of Mining Engineering, Director of the Curriculm in Mining Engineering, Dean of the College of Engineering*

E.M., Lehigh, 1909; M.S., 1911.

JAMES N. CAPERTON (1943).....*Professor of Military Science and Tactics*

B.S., U.S. Military Academy, 1916; Colonel, U.S.A.

NEIL CAROTHERS (1923).....*Macfarlane Professor of Economics, Dean of the College of Business Administration*

B.A., Arkansas, 1905; Dip. in Econ., Oxford, 1907; Ph.D., Princeton, 1916.

WRAY HOLLOWELL CONGDON (1934) .....*Professor of Education, Dean of Undergraduates*

A.B., Syracuse, 1914; M.A., (Engl.) 1915; M.A., (Ed.), Michigan, 1922; Ph.D., 1929.

ROY BURFORD COWIN (1924).....*Professor of Accounting, Head of the Department of Accounting*

A.B., Michigan, 1916; M.A., 1918.

*EARL LEVERNE CRUM (1929, 1941).....*Professor of Greek, Head of the Department of Greek*

A.B., St. John's (Annapolis), 1913; A.M., Johns Hopkins, 1916; Ph.D., New York, 1924.

GEORGE BARTLETT CURTIS (1920, 1928)....*Registrar and University Editor*

A.B., Wesleyan, 1916; A.M., Columbia, 1923.

*Absent on leave.

HERBERT MAYNARD DIAMOND (1927)....*Professor of Economics, Head of the Department of Economics and Sociology*
B.A., Yale, 1914; Ph.D., 1917.

ALPHA ALBERT DIEFENDERFER (1902, 1930).....*Professor of Assaying and Quantitative Analysis*
B.S., in Chem., Lehigh, 1902; M.S., 1908.

GILBERT EVERETT DOAN (1926, 1937).....*Professor of Metallurgy, Head of the Department of Metallurgical Engineering, Director of the Curriculm in Metallurgical Engineering*
Ch.E., Lehigh, 1919; Ph.D., Berlin, 1926.

GEORGE WINSHIP EASTERDAY (1944).....*Professor of Military Science and Tactics*
B.S. in EE., George Washington University, 1909; Colonel, U.S.A.

WARREN WALTER EWING (1920, 1937)....*Professor of Physical Chemistry*
B.S., Parsons, 1912; M.S., Chicago, 1918; Ph.D., 1920.

*ADELBERT FORD (1931).....*Professor of Psychology, Head of the Department of Psychology*
A.B., Michigan, 1920; A.M., 1923; Ph.D., 1926.

TOMLINSON FORT (1927).....*Professor of Mathematics, Head of the Department of Mathematics and Astronomy, Dean of the Graduate School*
A.B., Georgia, 1906; A.M., 1909; A.M., Harvard, 1910; Ph.D., 1912.

LAWRENCE HENRY GIPSON (1924).....*Professor of History and Government, Head of the Department of History and Government*
A.B., Idaho, 1903; B.A., Oxford, 1907; Ph.D., Yale, 1918; F.R., Hist. S.

*GLEN WALTER HARMESON (1934, 1939).....*Professor of Physical Education, Director of Intercollegiate Athletics*
B.S., Purdue, 1930.

GEORGE DEWEY HARMON (1925, 1942).....*Professor of American History*
B.A., Duke, 1921; M.A., 1922; Ph.D., Pennsylvania, 1930.

ARTHUR WARNER KLEIN (1904, 1915).....*Professor of Mechanical Engineering*
M.E., Lehigh, 1899.

FRED VIALL LARKIN (1912, 1919)....*Professor of Mechanical Engineering, Head of the Department of Mechanical Engineering, Director of the Curricula in Mechanical Engineering and Industrial Engineering*
B.S., Wisconsin, 1906; M.E., 1915.

HOWARD SEAVOY LEACH (1924).....*Librarian*
A.B., Wesleyan, 1913; M.A., Princeton, 1915.

BENJAMIN LEROY MILLER (1907).....*Professor of Geology*
A.B., Kansas, 1897; A.M., Penn College, 1898; Ph.D., Johns Hopkins, 1903.

ROBERT PATTISON MORE (1916, 1942).....*Professor of German, Executive Secretary of the Graduate Faculty*
B.A., Lehigh, 1910; M.A., Harvard, 1913.

HARVEY ALEXANDER NEVILLE (1927, 1938).....*Professor of Chemistry and Chemical Engineering, Head of the Department of Chemistry and Chemical Engineering, Director of the Curricula in Chemistry and Chemical Engineering*
A.B., Randolph-Macon, 1918; M.A., Princeton, 1920; Ph.D., 1921.

*Absent on leave.

PHILIP MASON PALMER (1902, 1906).....*Professor of German, Head of the Department of German, Dean of the College of Arts and Science*
A.B., Bowdoin, 1900; A.B., Harvard, 1902; D.h.c., Litt.D.

MAX PETERSEN (1927, 1940).....*Professor of Physics*
B.S., Northwestern, 1913; M.A., 1914; Ph.D., Wisconsin, 1924.

JOSEPH BENSON REYNOLDS (1907, 1927)....*Professor of Mathematics and Theoretical Mechanics*
B.A., Lehigh, 1907; M.A., 1910; Ph.D., Moravian, 1919.

JONATHAN BURKE SEVERS (1927, 1941).....*Professor of English*
A.B., Rutgers, 1925; A.M., Princeton, 1927; Ph.D., Yale, 1935.

THOMAS EDGAR SHIELDS (1905, 1937).....*Professor of Music, Head of the Department of Music*
A.A.G.O., 1918; Mus.D., Muhlenberg, 1935.

CHARLES WELLINGTON SIMMONS (1928, 1940).....*Professor of Chemical Engineering*
B.Sc., Queen's, 1920; M.S., Lehigh, 1928.

LLOYD LEROY SMAIL (1926, 1929).....*Professor of Mathematics*
A.B., Washington, 1911; A.M., 1912; Ph.D., Columbia, 1913.

EARL KENNETH SMILEY (1934, 1938).....*Director of Admissions Acting Director of the Summer Session*
A.B., Bowdoin, 1921; M.A., Lehigh, 1935.

ROBERT METCALF SMITH (1925).....*Professor of English, Head of the Department of English*
A.B., Amherst, 1908; A.M., Columbia, 1909; Ph.D., 1915.

*BRADLEY STOUGHTON (1923).....*Professor of Metallurgy*
Ph.B., Yale, 1893; B.S., Massachusetts Institute of Technology, 1896.

MILTON CALEB STUART (1926).....*Professor of Mechanical Engineering*
B.S. in M.E., Pennsylvania, 1909; M.E., 1924.

HALE SUTHERLAND (1930).....*Professor of Civil Engineering, Head of the Department of Civil Engineering, Director of the Curriculm in Civil Engineering, Director of Fritz Laboratory*
A.B., Harvard, 1906; S.B., Massachusetts Institute of Technology, 1911.

EDWIN RAYMOND THEIS (1927, 1938).....*Professor of Chemical Engineering*
Ch.E., Cincinnati, 1921; Ph.D., 1926.

*HAROLD PRESCOTT THOMAS (1932).....*Professor of Education, Head of the Department of Education, Director of the Summer Session*
B.S., Colgate, 1920; Ed.M., Harvard, 1925; Ed.D., 1932.

STANLEY JUDSON THOMAS (1923, 1928).....*Professor of Bacteriology Head of the Department of Biology*
B.S., Lafayette, 1912; M.S., Lehigh, 1913; M.A., 1916; Ph.D., Pennsylvania, 1928.

BRADFORD WILLARD (1939).....*Professor of Geology, Head of the Department of Geology*
B.A., Lehigh, 1921; A.M., Harvard, 1922; Ph.D., 1923.

HORACE WETHERILL WRIGHT (1921, 1923).....*Professor of Latin, Head of the Department of Latin*
A.B., Wisconsin, 1908; Ph.D., Pennsylvania, 1917.

*Absent on leave.

ASSOCIATE PROFESSORS

CARL ELMER ALLEN (1930, 1939).....*Associate Professor of Accounting*
B.S., Illinois, 1923; M.S., 1925; Ph.D., 1930; C.P.A., Pennsylvania, 1939.

EDWARD DELBERT AMSTUTZ (1938, 1943).....*Associate Professor of Organic Chemistry*
B.S., College of Wooster, 1930; M.S., Institute of Paper Chemistry, 1932; Ph.D., Cornell, 1936

FRANK CHESTER BECKER (1927, 1942).....*Stewardson Associate Professor of Philosophy, Chairman of the Department of Philosophy*
A.B., Wesleyan, 1905.

SYLVANUS A. BECKER (1906, 1922).....*Associate Professor of Civil Engineering*
C.E., Lehigh, 1903; M.S., 1909.

WALLACE ROBERT BIGGS (1942).....*Associate Professor of Journalism*
A.B., Drury College, 1926; M.A., Washington University, 1927; Ph.D., Northwestern, 1933.

ROBERT DOMINICK BILLINGER (1929, 1939).....*Associate Professor of Chemistry*
Ch.E., Lehigh, 1921; M.S., 1925; Ph.D., Cincinnati, 1929.

CORNELIUS GODFREY BRENNECKE (1942).....*Associate Professor of Electrical Engineering*
A.B., Columbia, 1926; B.S., Columbia, School of Engineering, 1927; Ph.D., New York University, 1936.

PRESTON BANKS CARWILE (1927, 1931)....*Associate Professor of Physics*
A.B., Davidson, 1920; M.A., Virginia, 1924; Ph.D., 1927.

ELLIOTT WARD CHENEY (1942).....*Associate Professor of Physics*
A.B., Dartmouth College, 1920; Ph.D., Princeton University, 1926.

JAMES LOWRY CLIFFORD (1937, 1942).....*Associate Professor of English*
A.B., Wabash College, 1923; B.S., Massachusetts Institute of Technology, 1925; A.M., Columbia, 1932; Ph.D., 1941.

*JOHN ROBERT CONNELLY (1929, 1938).....*Associate Professor of Industrial Engineering*
B.S. in M.E., Illinois, 1927; M.S., 1929; M.A., Lehigh, 1934; M.E., Illinois, 1940.

WILLIAM JOSEPH ENEY (1936, 1941).....*Associate Professor of Civil Engineering*
B.E., Johns Hopkins, 1927; M.S., Lehigh, 1938.

AMOS ASCHBACH ETTINGER (1942).....*Associate Professor of History*
A.B., Muhlenberg College, 1921; A.M., University of Pennsylvania, 1923; D.Phil., Oxford University, 1930; Litt.D., Oglethorpe University, 1933; F. R. Hist. S.

*MAURICE EWING (1930, 1940).....*Associate Professor of Geophysics*
B.A., Rice Institute, 1926; M.A., 1927; Ph.D., 1931.

AUGUSTUS HENRY FRETZ (1918, 1933).....*Associate Professor of Geology*
Ph.B., Lafayette, 1903; C.E., 1906; M.S., 1924.

*AUSTIN ROGERS FREY (1929).....*Associate Professor of Physics*
S.B., Harvard, 1920; M.A., 1924; Ph.D., 1929.

JOHN H. FRYE (1935, 1943).....*Associate Professor of Metallurgy*
A.B., Howard, 1930; M.S., Lehigh, 1934; Ph.D., Oxon, 1942.

*Absent on leave.

MERTON OTIS FULLER (1912, 1922) ..... *Associate Professor of Civil Engineering*
C.E., Syracuse, 1910; M.S., Lehigh, 1934.

WILSON LEON GODSHALL (1939, 1940) ..... *Associate Professor of Diplomatic History and International Relations*
B.S., Pennsylvania, 1919; A.M., 1920; Ph.D., 1923; Director of Institute of Politics, 1943.

JAMES LARMOUR GRAHAM (1930, 1938) ..... *Associate Professor of Psychology, Acting Head of the Department of Psychology*
B.A., Muskingum, 1911; B.D., Union Theological Seminary, 1922; M.A., Columbia, 1922; Ph.D., Peabody, 1927.

THOMAS HUGER HAZLEHURST (1927, 1939) ..... *Associate Professor of Chemistry*
A.B., College of Charleston, 1923; Ph.D., Johns Hopkins, 1927.

GARTH AHYMAN HOWLAND (1927, 1933) ..... *Associate Professor of Fine Arts, Head of the Department of Fine Arts*
B.A., North Dakota, 1912; M.A., Harvard, 1930.

*CYRIL DEWEY JENSEN (1925, 1937) ..... *Associate Professor of Civil Engineering*
B.S. in C.E., Minnesota, 1921; C.E., 1930; M.S., Lehigh, 1929.

*BRUCE GILBERT JOHNSTON (1938, 1941) ..... *Associate Professor of Civil Engineering, Associate Director of Fritz Laboratory*
B.S. in C.E., Illinois, 1930; M.S., Lehigh, 1934; Ph.D., Columbia, 1938.

*HENRY CARL IVAR KNUTSON (1930, 1939) ..... *Associate Professor of Electrical Engineering*
E.E., Brooklyn Polytechnic, 1929; M.E.E., 1931.

THEODORE THOMAS LAFFERTY (1930, 1937) ..... *Selfridge Associate Professor of Philosophy, Associate Professor of Education*
A.B., Oklahoma City, 1924; M.A., Chicago, 1926; Ph.D., 1928.

KENNETH WORCESTER LAMSON (1926, 1930) ..... *Associate Professor of Mathematics*
A.B., Harvard, 1906; Ph.D., Chicago, 1917.

ROBERT EDWARD LARAMY (1940, 1942) ..... *Associate Director of Admissions*
B.A., Lehigh, 1896; M.A., 1899.

*CHARLES ROZIER LARKIN (1929, 1937) ..... *Associate Professor of Physics*
B.A., Virginia, 1923; M.A., 1925; Ph.D., 1929.

ARCHIE ROSCOE MILLER (1922, 1938) *Associate Professor of Electrical Engineering*
B.S. in E.E., Illinois, 1918; M.S., Lehigh, 1925.

HARRY GORDON PAYROW (1916, 1942) ..... *Associate Professor of Sanitary Engineering*
B.S. in C.E., Tufts, 1907.

GEORGE EMIL RAYNOR (1931, 1935) ..... *Associate Professor of Mathematics*
B.S., Washington, 1918; M.A., Princeton, 1920; Ph.D., 1923.

EDGAR HEISLER RILEY (1926, 1931) ..... *Associate Professor of English*
A.B., Cornell, 1915; Ph.D., 1925.

ERNST BERNHARD SCHULZ (1927, 1931) ..... *Associate Professor of Political Science*
B.S., Michigan, 1920; M.A., 1921; Ph.D., 1927.

EARL JAMES SERFASS (1936, 1943) ..... *Associate Professor of Chemistry*
B.S. in Ch.E., Lehigh, 1933; M.S., 1935; Ph.D., 1938.

*Absent on leave

CLARENCE ALBERT SHOOK (1930, 1935) ..... *Associate Professor of Mathematics*
A.B., Western Reserve, 1916; A.M., Harvard, 1918; Ph.D., Johns Hopkins, 1928.

RAFAEL ARCÁNGEL SOTO (1925, 1943) ... *Associate Professor of Romance Languages*
B.S., Illinois, 1912; B.A., 1915; M.A., 1917.

FRANCIS JOHN TREMBLEY (1928, 1941) ..... *Associate Professor of Biology*
B.S., Hobart College, 1928; M.S., Lehigh, 1931; Ph.D., Pennsylvania, 1940.

LAWRENCE WHITCOMB (1930, 1939) ..... *Associate Professor of Geology*
Ph.B., Brown, 1922; A.M., Princeton, 1928; Ph.D., 1930.

ASSISTANT PROFESSORS

*WILLIAM APPLETON AIKEN (1941) ..... *Assistant Professor of History*
B.A., Yale, 1929; M.Litt., Cambridge (England), 1932; Ph.D., Yale, 1939.

FAY CONANT BARTLETT (1917, 1921) ..... *Assistant Professor and Director of Physical Education*

FRANK SWAN BEALE (1930, 1935) ... *Assistant Professor of Mathematics*
B.S., Maine, 1921; M.S., 1923; Ph.D., Michigan, 1931.

GEORGE CARLTON BECK (1904, 1913) ..... *Assistant Professor of Quantitative Analysis*
A.C., Lehigh, 1903.

PETER GABRIEL BERGMANN (1942) ..... *Assistant Professor of Physics*
Sc.D., University of Prague, 1936.

ARTHUR F. BOWEN (1942) ..... *Assistant Professor of Military Science and Tactics*
Lt. Colonel, U.S.A.

*CLEO BRUNETTI (1937, 1939) ..... *Assistant Professor of Electrical Engineering*
B.E.E., Minnesota, 1932; Ph.D., 1937.

*ROBERT DEXTER BUTLER (1936, 1939) ... *Assistant Professor of Geology*
S.B., Massachusetts Institute of Technology, 1932; Ph.D., 1936.

JOSEPH CALVIN CALLAGHAN (1936, 1939) ..... *Assistant Professor of English and Speech*
A.B., Michigan, 1931; M.A., 1932.

JAMES DUNCAN CAMPBELL (1940, 1942) ..... *Assistant Professor of Military Science and Tactics*
A.B., Gettysburg College, 1937; Captain, U.S.A.

GLENN JAMES CHRISTENSEN (1939, 1942) ..... *Assistant Professor of English*
B.A., College of Wooster, 1935; Ph.D., Yale, 1939.

EDWARD HUTCHINS CUTLER (1930, 1940) ..... *Assistant Professor of Mathematics*
A.B., Harvard, 1925; A.M., 1926; Ph.D., 1930.

*CLARENCE DANHOF (1937, 1941) ..... *Assistant Professor of Economics*
A.B., Kalamazoo College, 1932; M.A., Michigan, 1933; Ph.D., 1939.

FREDERIC PHILIP FISCHER (1942) ..... *Assistant Professor of Electrical Engineering*
B.Sc., in E.E., Rutgers University, 1932; M.Sc. in E.E., Lehigh University, 1936.

*Absent on leave

FRANK JUNIOR FORNOFF (1940, 1942).....*Assistant Professor of Chemistry*

A.B., University of Illinois, 1936; M.Sc., Ohio State, 1937; Ph.D., 1939.

ROBERT TAYLOR GALLAGHER (1942).....*Assistant Professor of Mining Engineering*

B.S., Pennsylvania State College, 1927; M. A., University of Missouri School of Mines, 1938; D.Eng., Colorado School of Mines, 1941.

HOWARD DIETRICH GRUBER (1914, 1918).....*Assistant Professor of Electrical Engineering*

E.E., Lehigh, 1909; M.S., 1923.

*BYRON CROMWELL HAYES (1941).....*Assistant Director of Admissions*

B.E., Illinois State Teachers College, 1935; M.A., University of Chicago, 1938.

ARTHUR THOMAS IPPEN (1938, 1939).....*Assistant Professor of Civil Engineering*

Dipl. Ing., Technische Hochschule, Aachen, Germany, 1931; M.S., California Institute of Technology, 1935; Ph.D., 1936.

THOMAS EDGAR JACKSON (1937, 1942).....*Assistant Professor of Mechanical Engineering*

B.S., in M.E., Carnegie Institute of Technology, 1934; M.S., Lehigh, 1937.

*WILLIAM LEROY JENKINS (1935, 1939).....*Assistant Professor of Psychology*

B.S. in Chem., Brooklyn Polytechnic Institute, 1921; M.A., Michigan, 1932; Ph.D., 1936.

RUSSELL H. JOHNSON (1942).....*Assistant Professor of Military Science and Tactics*

B.S., University of Illinois, 1932; M.S., Michigan College of Mining and Technology, 1934; Major, U.S.A.

*THOMAS FREDERICK JONES (1939) ....*Assistant Professor of Economics*

B.A., Ohio State, 1933; M.A., Columbia, 1934.

*EARL LAWRENCE KNIGHT (1941).....*Assistant Professor of Economics*

B.S., Temple, 1928; M.A., Ohio State, 1932; Ph.D., 1940.

VORIS V. LATSHAW (1931, 1938).....*Assistant Professor of Mathematics*

B.A., Indiana, 1927; A.M., 1928; Ph.D., 1930.

LUCIEN TENNENT LEE, JR. (1942)..... .....*Assistant Professor of Education Acting Head of the Department of Education*

B.S., Alabama Polytechnic Institute, 1928; M.A., University of Alabama, 1938; Ed.D., Teachers College, Columbia, 1942.

ROBERT MARVIN MAINS (1941, 1942)..... .....*Assistant Director of Fritz Laboratory*

B.S., University of Colorado, 1938; M.S., University of Illinois, 1940.

*ROBERT WALLACE MAYER (1933, 1938)..... *Assistant Professor of Economics*

B.S., Illinois, 1930; M.S., 1931; Ph.D., 1933.

WILLIAM ANDREW MCDONALD (1939, 1942).....*Assistant Professor of Latin*

B.A., Toronto, 1935; M.A., 1936; Ph.D., Johns Hopkins, 1940.

*Absent on leave

ROBERT FRANCIS MCNERNEY, JR. (1939, 1941) ..... *Assistant Professor of Romance Languages*
Ph.B., Yale, 1929; Ph.D., 1937.

HERBERT GRUNFELD MEANS (1943) .... *Assistant Professor of Mathematics*
Ph.B., Grove City College, 1913; A.M., University of Pittsburgh, 1926; D. Ed., Geneva College, 1940.

DOUGLES EWART MODE (1940, 1942) ..... *Assistant Professor of Electrical Engineering*
B.S. in E.E., Pennsylvania, 1935; M.S., 1940.

BASIL WALDO PARKER (1940) ..... *Assistant Professor of Biology*
S.B., Massachusettts Institute of Technology, 1933; Ph.D., 1939; A.M., Harvard, 1935.

*ARTHUR EVERETT PITCHER (1938, 1939) ..... *Assistant Professor of Mathematics*
A.B., Western Reserve, 1932; A.M., Harvard, 1933; Ph.D., 1935.

*JOHN GRIFFITH ROBERTS (1937, 1939) ... *Assistant Professor of Romance Languages*
A.B., Randolph-Macon, 1922; A.M., Harvard, 1925; Ph.D., 1935.

*FREDERIC ALLEN SCOTT (1935, 1939) ..... *Assistant Professor of Physics*
B.S., New York State College for Teachers, 1924; M.S., Lehigh, 1929; Ph.D., Rice Institute, 1935.

DONALD EUGENE SMALL (1943) ..... *Instructor in Military Science and Tactics*
B.A., Gettysburg, 1931; 1st Lieut., Army of the U.S.

*MALCOLM FINLAY SMILEY (1938, 1941) ..... *Assistant Professor of Mathematics*
S.B., Chicago, 1934; Ph.D., 1937.

JUDSON GRAY SMULL (1919, 1938) ..... *Assistant Professor of Chemistry*
B.S., in Chem., Lehigh, 1906; M.S., 1921.

*BENJAMIN LICHTY SNAVELY (1931, 1938) ..... *Assistant Professor of Physics*
B.S. in Eng. Phys., Lehigh, 1928; Ph.D., Princeton, 1935.

DUNCAN STEWART, JR. (1941) ..... *Assistant Professor of Geology*
B.S., University of Michigan, 1928; Sc.M., Brown University, 1930; Ph.D., University of Michigan, 1933.

CHARLES EMMET STOOPS, JR. (1942) .... *Assistant Professor of Chemical Engineering*
B.Ch.E., Ohio State University, 1937; Ph.D., Purdue University, 1942.

CARL FERDINAND STRAUCH (1938, 1941) .... *Assistant Professor of English*
A.B., Muhlenberg College, 1930; M.A., Lehigh, 1934.

JOHN SCHRADER TREMPER (1939) ..... *Assistant Professor of German*
A.B., Colgate, 1928; M.A., Cornell, 1932; Ph.D., 1938.

EUGENE HENRY UHLER (1919, 1921) ..... *Assistant Professor of Civil Engineering*
C.E., Lafayette, 1908.

RALPH NEWCOMB VANARNAM (1928, 1942) ..... *Assistant Professor of Mathematics and Astronomy*
E.E., Cornell, 1926; M.S., 1927.

ALBERT CHARLES ZETTLEMOYER (1941, 1943) ..... *Assistant Professor of Chemistry*
B.S., Lehigh, 1936; M.S., 1938; Ph.D., M. I. T., 1940.

*Absent on leave

LECTURERS

CHARLES AUSTIN BUCK (1933)..... *Lecturer on Procurement of Raw Materials*
B.S. in Chem., Lehigh, 1887; Eng.D. (Hon.), 1930.

NICHOLAS HUNTER HECK (1937)..... *Lecturer on Geophysics*
B.A., Lehigh, 1903; C.E., 1904; Sc.D. (Hon.), 1930.

HARRY FREDERICK HOFFMAN (1926)..... *Lecturer in Psychiatry and Mental Hygiene*
M.D., Hahnemann Medical College, 1910.

ROY A. LEWIS (1924)..... *Lecturer on Plant Management*

INSTRUCTORS

LEE TERRELL ASKREN (1941)..... *Instructor in Mechanical Engineering*
B.S. in M.E., Purdue, 1939.

ROBERT AUGUST BUERSCHAPER (1929, 1941)..... *Instructor in Physics*
B.S. in Eng. Phys., Lehigh, 1937; M.S., 1940.

*IRWIN RUSSEL BURKEY (1942)..... *Instructor in Mechanical Engineering*
B.S., Lehigh University, 1942.

ELBERT FRANCIS CARAWAY (1941)..... *Instructor in Physical Education*
B.S., Purdue, 1930.

*RICHARD MALONE DAVIS (1941)..... *Instructor in Economics*
A.B., Colgate, 1939; M.A., Cornell, 1941.

WARREN EDWIN DEIFER (1944)..... *Instructor in Mechanical Engineering*
B.S. in I.E., Lehigh, 1941.

THEODORE GEORGE EHRSAM, JR. (1943)..... *Instructor in English*
B.A., Lehigh, 1931; M.A., 1932.

*GEORGE EKAITIS (1942)..... *Instructor in Physical Education*
A.B., Western Maryland College, 1931.

JAMES VANDEUSEN EPPES (1940).... *Instructor in Mechanical Engineering*
B.A., University of Virginia, 1928; M.E., Cornell, 1931.

*GEORGE DORMER FARNÉ (1934)..... *Instructor in Romance Languages*
A.B., Columbia College, 1926; M.A., Columbia, 1927.

WALTON FORSTALL, JR. (1940)..... *Instructor in Mechanical Engineering*
B.S. in M.E., Lehigh, 1931; M.S., 1943.

JOSEPH WILLIAM FOSTER..... *Instructor in Military Science*
B.S. in Bus. Adm., Texas A. and M., 1936; 1st Lieut., Army of the U.S.

*JAMES ALLEN GORDON (1941)..... *Instructor in Physical Education*
B.S., Miami University, 1931; M.A., Ohio State, 1936.

JOHN HAMMES GROSS (1944)..... *Instructor in Mechanical Engineering*
B.S. in Met. E., Lehigh, 1944.

PAUL HESSEMER (1942)..... *Instructor in Civil Engineering*
Dipl. Ing., State Institute of Technology, Darmstadt, Germany, 1914.

JOSEPH EDWARD ILLICK (1941)..... *Instructor in Mathematics*
C.E., Lehigh, 1921; M.S., 1933.

*Absent on leave

EVERETT LEE JONES (1940, 1941).....*Instructor in English*
A.B., Antioch College, 1938; M.A., Lehigh, 1941.

JOHN ATHAN KARAS (1943).....*Instructor in Physics*
B.S. in Engr. Phys., Lehigh University, 1943.

ERVAND KOGBETLIANTZ (1942).....*Instructor in Mathematics*
A.B., University of Moscow; Ph.D., University of Paris.

*HENRY AUGUST KREIBEL (1939).....*Instructor in Accounting*
B.S. in Bus. Adm., Lehigh, 1932; M.A., 1937.

WILLIAM FREDERICK LOTZ, JR. (1942).....*Instructor in Civil Engineering*
B.S. in C.E., Lehigh University, 1936.

FRANCIS S. MCGUINESS (1943).....*Instructor in Mechanical Engineering*
B.S. in M.E., Lehigh University, 1943.

MELVIN PAUL MOORHOUSE (1942)....*University News Editor, Instructor in Journalism*
A.B., Westminster College, 1935.

ELIAS ROBBINS MORGAN (1943).....*Instructor in Mechanical Engineering*
M. E., Lehigh University, 1903.

ALBERT AUGUSTUS RIGHTS (1933).....*Instructor in English and Speech*
A.B., Maine, 1927; A.M., Harvard, 1931.

WILLIAM HAROLD ST. CLAIR (1944).....*Instructor in Mechanical Engineering*
B.S. in M.E., Lehigh, 1944.

LEONARD B. SAVASTIO (1943).....*Instructor in Civil Engineering*
C.E., Lehigh University, 1913.

DAVID GALLUP SCOTT (1927).....*Instructor in Romance Languages*
B.A., Princeton, 1925; M.A., Yale, 1926.

*JAMES PLATTENBERGER SELL (1934, 1937).....*Instructor in Biology*
B.A., Oberlin, 1931; M.S., Lehigh, 1937.

WILLIAM SHERIDAN (1911).....*Instructor in Physical Education*

*PAUL EDWARD SHORT (1938)....*Assistant Director of Athletics, Instructor in Physical Education*
B.S. in Bus. Adm., Lehigh, 1934.

ROBERT DANIEL STOUT (1939)....*Instructor in Metallurgical Engineering*
B.S., Pennsylvania State College, 1935; M.S., Lehigh University, 1941.

*LOUIS REED TRIPP (1939).....*Instructor in Economics*
A.B., Union College, 1934; Ph.D.

ANDRÉ WEIL (1942).....*Instructor in Mathematics*
Sc.D., University of Paris, 1928.

WALTER EMIL WOCKENFUSS (1941).....*Assistant in Military Science Engineering*
B.M.E., College of the City of New York, 1942.

ASSISTANTS

RICHARD LEROY BROWN (1942).....*Instructor in Physical Education*
B.S., East Stroudsburg State Teachers College, 1933.

GEORGE FRANCIS GASDA (1928).....*Assistant in Military Science and Tactics*
Master Sergeant, D.E.M.L., U.S.A.

* Absent on leave.

EMIL ANDREW HAVACH (1941).....*Assistant in Physical Education*
D.S.C., Temple, 1937.

WILLIS A. HEISEY (1942).....*Assistant in Chemistry*
B.S., Albright College, 1942.

OATHA RALPH LINKOUS (1942).....*Assistant in Military Science and Tactics*
Staff Sergeant, U.S.A.

FREDERIC MERCUR (1935).....*Assistant in Physical Education*

LEO FRANCIS PRENDERGAST (1941).....*Assistant in Physical Education*
B.S., Moravian College, 1936.

KURT WEBER (1942).....*Assistant in Physics*
B.S., Lehigh University, 1942.

WALTER EMIL WOCKENEUSS (1941).....*Assistant in Military Science and Tactics*
Sergeant, U.S.A.

FELLOWS

JOHN RUSWEILER CANN (1942).....*Raybestos-Manhattan Fellow*
B.S., Moravian College, 1942.

BELA KALMAN ERDOSS.....*Byllesby Fellow in Mechanical Engineering*
M.E., Royal Joseph University of Technical Sciences, 1927.

DALE HARRIS (1942).....*Institute of Research Fellow in Bacteriology*
B.A., Lehigh University, 1942.

THOMAS GARDE HARRIS (1937).....*Institute of Research Fellow in Chemistry*
B.S. in Ch.E., Lehigh, 1937; M.S., 1939; Ph.D., 1941.

GEORGE DOUGLAS NELSON (1942).....*Research Assistant in Chemistry*
B.S., Randolph-Macon, 1941.

CLIFTON REMS NEUMOYER (1942).....*Student Chemical Foundation Fellow*
B.S., Lehigh University, 1938.

PRESTON PARR (1943).....*Raybestos-Manhattan Research Fellow*
B.S. in Ch.E., Lehigh University, 1943.

CHARLES WINFRED TUCKER (1941).....*Research Assistant in Chemistry*
B.S. in Ch.E., Cooper Union, 1941.

SUMMER SESSIONS

(In addition to members of the regular staff)

WILLIAM GEORGE HAYWARD.....*Principal, Elmwood Elementary School, East Orange, N. J.*
B.S., Rutgers University, 1930; A.M., Teachers College, Columbia University, 1932; Ed. D., 1940.

ABEL HANSON.....*Active Supervising Principal of Schools, 16th District Public Schools, Elmont, N. Y.*

STANDING COMMITTEES OF THE FACULTY

(The term of each member expires in June of the year given in parentheses after his name. The President is ex officio a member of all committees)

ADMISSIONS: Director of Admissions Smiley (*ex officio*), Dean Congdon, (*ex officio*), Registrar Curtis (*ex officio*), Professors Shook (1944), Bayley (1945), Anderson (1946), H. P. Thomas (1947), Crum (1948), Allen (1949), Riley (1950).

ADVANCED STANDING: Registrar Curtis (*ex officio*), Director of Admissions Smiley (*ex officio*), Professors Sinkinson (1944), Bradford (1944), Anderson (1946), W. W. Ewing (1947).

DISCIPLINE: Dean Congdon (*ex officio*), Professors Shook (1944), Crum (1943), Beale (1946), and one student member, W. Robert Moore.

EDUCATIONAL POLICY: Dean Congdon (*ex officio*), Professors Stuart (1944), Schulz (1945), More (1946), Willard (1947), Cowin (1948).

FACULTY EDUCATIONAL CLUB: Professors Butts (1944), Godshall (1944), Hazlehurst (1945), Stuart (1945), Schulz (1946), Reynolds (1946).

HONORARY DEGREES: Professors Doan (1944), B. L. Miller (1945), Neville (1946), Barthold (1947), Cowin (1948), Gipson (1949).

HOUSE COMMITTEE, Drown Memorial Hall: Professor Beardslee and two student members: L. Stanford Willis and David C. Kirk.

INSPECTION TRIPS: Professors Forstall (1944), Payrow (1945), Stewart (1946), Sinkinson (1947), A. R. Miller (1948).

PETITIONS: Registrar Curtis (*ex officio*), Professors Cowin and Eney (1944), Diamond and Reynolds (1945), Anderson and Christensen (1946).

PUBLICATIONS, BOARD OF: Dean Congdon (*ex officio*), Professors Biggs (*ex officio*), Severs and three student members: Lee Greenbaum, Fritz von Bergen, V. Warren Fox, Jr.

ROSTER: Registrar Curtis (*ex officio*), Professors Callaghan (1944), Gruber (1945), Lamson (1947), Hazlehurst (1948).

STANDING OF STUDENTS: Deans Congdon, Palmer, Carothers, Callen, Professors Beaver, Bidwell, Doan, F. V. Larkin, Neville, Sutherland, Registrar Curtis, Director of General College Division H. P. Thomas, Director of Admissions Smiley, (*all members ex officiis*).

STUDENT ACTIVITIES: Dean Congdon (*ex officio*), Professors Trembley (1944), Whitcomb (1945), and three student members: F. William Bloecher, Jr., Fritz von Bergen, V. Warren Fox, Jr.

STUDENT CLUB FINANCES: Dean Congdon (*ex officio*), Professors Beardslee (1944), Allen (1945), and three student members: Ralph A. Evans, David C. Kirk, Leslie R. Little.

SUMMER SESSION: Professors H. P. Thomas (*ex officio*), Jenkins (1944), Whitcomb (1945), Eney (1946), Severs (1947), Stewart (1948).

ADMINISTRATION

Office of the President

CLEMENT CLARENCE WILLIAMS, B.S., B.S. in C.E., C.E., LL.D., Eng.D., Sc.D., *President*
HELEN GENEVIEVE RYAN, *Secretary to the President*

Office of the Treasurer

*JOHN IRVINE KIRKPATRICK, B.S. in Bus. Adm., *Treasurer*
ROBERT SAYRE TAYLOR, B.S., LL.B., *Acting Treasurer*
FREDERICK RALPH ASHBAUGH, *Bursar and Purchasing Agent*
MELVIN SCHISSLER, C.P.A., *Auditor*
*JOHN WALTER MAXWELL, JR., B.S. in Bus. Ad., *Manager of the Supply Bureau*
STANLEY FREDERICK HEFFNER, *Acting Manager of the Supply Bureau*
EDWARD A. HOWER, *Manager of Realty, Brodhead Estate*
EDNA VIRGINIA DEAN, *Secretary to the Treasurer*

Office of the Dean of Undergraduates

WRAY HOLLOWELL CONGDON, A.B., M.A., Ph.D., *Dean of Undergraduates*

Office of the Registrar

GEORGE BARTLETT CURTIS, A.B., A.M., *Registrar and University Editor*
LEANOR RUTH GILBERT, *Recorder*
VIRGINIA RAIDLINE, *Assistant Recorder*

Office of the Director of Admissions

EARL KENNETH SMILEY, A.B., M.A., *Director*
ROBERT EDWARD LARAMY, B.A., M.A., *Associate Director*

Deans of Divisions

PHILIP MASON PALMER, A.B., D.h.c., Litt.D., *Dean of the College of Arts and Science and of the General College Division*
NEIL CAROTHERS, B.A. DIP. IN ECON., PHD., *Dean of the College of Business Administration*
ALFRED COPELAND CALLEN, E.M., M.S., *Dean of the College of Engineering*
TOMLINSON FORT, A.B., A.M., PH.D., *Dean of the Graduate School*

Directors of Curricula

PHILIP MASON PALMER, A.B., D.h.c., Litt.D., *Arts and Science*
NEIL CAROTHERS, B.A., DIP. IN ECON., PH.D., *Business Administration*
HARVEY ALEXANDER NEVILLE, A.B., M.A., PH.D., *Chemistry and Chemical Engineering*
HALE SUTHERLAND, A.B., S.B., *Civil Engineering*
JACOB LYNFORD BEAVER, E.E., M.S., Sc.D., *Electrical Engineering*
CHARLES CLARENCE BIDWELL, A.B., PH.D., *Engineering Physics*
FRED VIALL LARKIN, B.S., M.E., *Mechanical Engineering and Industrial Engineering*
GILBERT EVERETT DOAN, CH.E., PH.D., *Metallurgical Engineering*
ALFRED COPELAND CALLEN, E.M., M.S., *Mining Engineering*

*Absent on leave

Summer Session

E. KENNETH SMILEY, M.A., *Director*

Faculty

GEORGE BARTLETT CURTIS, A.B., A.M., *Secretary*

Legal Counsel

ROBERT SAYRE TAYLOR, B.S., LL.B., *Legal Counsel*

Linderman Memorial Library

HOWARD SEAVOY LEACH, A.B., M.A., *Librarian*
MARY ELIZA WHEATLEY, A.B., A.M., *Head Cataloguer*
RUTH HALL URBAN, B.A., B.S. in L.S., *Assistant Cataloguer*
MARY ELIZABETH VOOS, B.S., *Assistant Cataloguer*
LILLIE HESS, B.S. in Educ., B.S. in Lib. Sci., *Head of Circulation Department*
ELIZABETH REGINA HARTMAN, B.A., B.S. in Lib. Sci., *Assistant Circulation Librarian*

Packer Memorial Church

THE REV. CLAUDE GILLETTE BEARDSLEE, B.A., B.D., M.A., S.T.M., PH.D., *Chaplain*
THOMAS EDGAR SHIELDS, Mus.D., A.A.G.O., *Organist*

The Fritz Engineering Laboratory

HALE SUTHERLAND, A.B., S.B., *Director*

Students' Health Service

RAYMOND COOLEY BULL, B.S., A.B., M.D., *Director*
CARL OTTO KECK, M.D., *Assistant Director*
ELIZABETH BEHR AGOCS, R.N., *Nurse in charge of Dispensary*
ARLINE MAE CULP, R.N., *Assistant Nurse*

Lamberton Dining Service

BERTHA BOWMAN, B.A., *Manager of Dining Service*

Division of Intercollegiate Athletics

ELBERT FRANCIS CARAWAY, B.S. in Ed., *Acting Director of Athletics and Business Manager*

University Band

THOMAS EDGAR SHIELDS, Mus.D., A.A.G.O., *Director*

University News Service

MELVIN PAUL MOORHOUSE, A.B., *University News Editor*

Placement Bureau

ELIAS ROBINS MORGAN, M.E., *Director*

Department of Buildings and Grounds

ANDREW WILLARD LITZENBERGER, *Superintendent of Buildings and Grounds*

JOHN DAVID HARTIGAN, *Superintendent of Power Plant*

STANLEY HARRISON PETERS, *General Foreman*

Alumni Association

ROBERT FORD HERRICK, B.A., *Executive Secretary*

LEONARD HUBERT SCHICK, A.B., *Assistant Secretary and Editor of the Lehigh Alumni Bulletin*

Special Standing Committees

ADVISORY COUNCIL ON GENERAL EDUCATION: Professors Diamond, Executive Chairman, Beardslee, Secretary, F. C. Becker, Doan, Neville, Palmer, Shook, Smith, Sutherland, Butts, Crum, Gipson, Hazlehurst, Trembley, Whitcomb, Howland, Clifford.

ART EXHIBITIONS: Professors Palmer, Howland, Petersen, Librarian Leach.

ATHLETIC ELIGIBILITY: Messrs. Caraway (*ex officio*), Beaver (1944), Willard (1945), Whitcomb (1946), Barthold (1947).

"BOSEY REITER CUP" COMMITTEE: Dean Congdon, Dr. Beardslee, Director of Admissions Smiley.

CHAPEL: Professors Beardslee, Shields, Reynolds, Beaver.

EXECUTIVE COMMITTEE OF THE GRADUATE FACULTY: Dean Fort (*ex officio*), Professors More (*ex officio*), Neville (1944), Doan (1945), Willard (1946), Smith (1947), Barthold (1948).

INSTITUTE OF RESEARCH: President Williams, Deans Fort, Carothers, Callen, Palmer, University Editor Curtis (*ex officiis*); Professors Sutherland, F. V. Larkin, Bidwell, Gipson, S. J. Thomas, Willard, Doan, Neville, Graham and Beaver.

LECTURES: Professors Harmon (1944), Anderson (1944), Clifford (1945), Bratt (1945), Graham (1946), Registrar Curtis (1946).

LIBRARY: Librarian Leach (*ex officio*), Professors Severs (1945), Lamson (1946).

MUSIC: Professors Shields, Palmer, Beardslee, Registrar Curtis.

PROFESSIONAL ENGINEERING DEGREES: Professors F. V. Larkin, Sutherland, Callen, Doan.

REGISTER: Registrar Curtis, Director of Admissions Smiley, Professors Smith, Cowin.

SCHOLARSHIPS AND LOANS: Dean Congdon, Bursar Ashbaugh, Director of Admissions Smiley.

STUDENT CONCERTS—LECTURES SERIES, FACULTY ADVISORY COMMITTEE ON: Registrar Curtis, Professors Shields, Shook.

TEACHER PLACEMENT: Dean Congdon, Dean Palmer, Mr. Morgan.

WILLIAMS SENIOR PRIZES: Professors Smith, Palmer, Carothers, Gipson, Graham, Crum.

HISTORY

Lehigh University was chartered by the Legislature of Pennsylvania by an act dated February 9, 1866. In 1865 the Hon. Asa Packer, of Mauch Chunk, inaugurated a movement to provide an institution that would afford training and education in the learned professions as then recognized, and in technical branches, the importance of which was then just becoming apparent in the development of the industrial and transportation interests of the country. He made an initial donation of a large tract of land for this purpose and the sum of $500,000.00 to which he added largely during his lifetime and by his will.

Since its foundation the equipment and resources of the University have steadily increased through the continued interest of the university's trustees, alumni, and friends. The University now occupies twenty-three buildings and its grounds cover one hundred and ninety acres on the north side of South Mountain, overlooking the valley of the Lehigh River and the city of Bethlehem.

The present endowment totals $8,000,000.00.

REQUIREMENTS FOR ADMISSION

The enrollment of Lehigh University is strictly limited by action of its board of trustees, with a resulting limitation in the number of candidates who can be admitted each year in the several divisions of the University. Women are not admitted as undergraduates or as special students except in the summer session.

In the selective procedure necessitated by this limitation, the University, through its office of admissions, takes into account a number of criteria, which are believed to have some individual validity, and in combination a high degree of validity, in predicting probable success in college work. The object is to select those candidates who are most likely to profit fully by the programs offered at this University.

The criteria considered include:

I. Certain quantitative subject-matter requirements.

II. The quality of the individual student's work in the secondary school.

III. Such qualifications as sound health, emotional stability, intellectual motivation, and established habits of industry and regularity.

IV. The candidate's showing in a scholastic aptitude test and other tests, in cases where such tests are prescribed by the University.

I. QUANTITATIVE SUBJECT-MATTER REQUIREMENTS

All candidates must offer fifteen units of entrance credit, by certificate from an accredited school, or by examination, or by a combination of these methods.* The fifteen units represent the quantitative equivalent of the usual four-year high school or preparatory school course.

PRESCRIBED SUBJECTS

The fifteen units must include certain prescribed subjects, together with sufficient electives to make up the required total. The only subjects prescribed are those which are essential prerequisites for college courses which the student should take in his first year in the University.

For the several colleges within the University, the prescribed subjects and the number of electives are as follows:

For the College of Arts and Science—

	Units *
English	3
Foreign language (ordinarily Latin or German or French or Spanish)	2
Elementary and Intermediate Algebra	1½
Plane Geometry	1
Electives	7½
	15

For the College of Business Administration—

	Units *
English	3
Elementary and Intermediate Algebra	1½
Plane Geometry	1
Electives	9½
	15

*A unit represents a year's study in a single subject in a secondary school, comprising the work of 180 recitation periods (5 periods a week for 36 weeks) of 40 minutes each or the equivalent.

For the College of Engineering—

	Units *
English	3
Elementary and Intermediate Algebra	1½
Plane Geometry	1
Plane Trigonometry and Logarithms	½
Solid Geometry *or* Advanced Algebra	½
Electives	8½
	15

ELECTIVES

The electives may be offered in any subject studied under standard conditions in an accredited high school or preparatory school. In general, electives in the fields of foreign language, mathematics, history, and science are preferred, but in the case of a superior student the requirements as to electives may be satisfied in whole or in part by courses in commercial subjects, manual arts, or fine arts.

It should be understood, however, that meeting in full the foregoing subject requirements does not insure admissions, but insures only eligibility for consideration in the light of remaining criteria.

II. THE CRITERION OF QUALITY

The quality of the student's work will be judged primarily by his rank or relative average grade in his class. Consideration will be given also to the extent to which he has made grades distinctly higher than the passing grade; to evidence of improvement or deterioration in quality in the course of his progress through the secondary school; to his relative success or failure in the particular subjects which he proposes to continue in college; and to the comments and recommendations of his principal or headmaster.

III. OTHER QUALIFICATIONS

Information with respect to the other qualifications considered, including sound health, emotional stability, intellectual motivation, and established habits of industry and regularity, is obtained

*A unit represents a year's study in a single subject in a secondary school, comprising the work of 180 recitation periods (5 periods a week for 36 weeks) of 40 minutes each or the equivalent.

from principals and headmasters, and may be supplemented through personal interviews. The University reserves the right to require any candidate for admission to present himself for an interview and to base the selection of candidates in part upon the appraisals obtained through such interviews.

IV. SCHOLASTIC APTITUDE TESTS AND OTHER TESTS

Examinations may be required of any candidate. Examinations will not be given as a substitute admission procedure when an applicant's record is in general unsatisfactory, but will be assigned to obtain supplementary evidence when there is reasonable doubt as to the applicant's readiness to do successful college work, and when additional information is desired for proper placement.

Two forms of examinations are available, Plan A and Plan B.

Under Plan A the applicant will take an examination in each subject which he has failed to pass or has passed with a grade too low to merit admission without further validation of his preparation in the subject. Deficiencies in prescribed entrance units never taken in school may also be made up by Plan A examinations.

Under Plan B the applicant is examined for his general ability to do college work. This plan usually includes three examinations: English comprehensive, mathematics comprehensive, and a scholastic aptitude test.

SCHOLASTIC APTITUDE TEST

Any candidate may be required to take a scholastic aptitude test. Ordinarily this test will be required of students ranking in the lower half of their graduating class in the high school or preparatory school. In cases where such a test is required the University may prescribe either the scholastic aptitude test given by the College Entrance Examination Board or a scholastic aptitude test to be taken at the University.

The College Entrance Examination Board will administer the following four series of tests during the academic year 1944-1945:

Saturday, December 2, 1944
Saturday, April 7, 1945
Saturday, June 2, 1945
Wednesday, September 5, 1945

The following program of tests will be offered at each series:

9:00 A.M.—Scholastic Aptitude Test—including a verbal and mathematical section (three hours)

2:00 P.M.—Achievement Tests—Not more than three of the following one-hour tests:

English Composition	Spanish Reading
Social Studies	Biology
French Reading	Chemistry
German Reading	Physics
Latin Reading	Spatial Relations

2:00 P.M.—*Comprehensive Mathematics Test (three hours)

A Bulletin of Information containing rules for the filing of applications and the payment of fees, lists of examination centers, etc., may be obtained without charge from the College Entrance Examination Board. The Board does not publish a detailed description of the Scholastic Aptitude Test, the Comprehensive Mathematics Test, or the Achievement Tests. Brief descriptions are included in the Bulletin. A practice form of the Scholastic Aptitude Test will be sent to every candidate who registers for this test.

Candidates should make application by mail to the College Entrance Examination Board, P. O. Box 592, Princeton, New Jersey. Blank forms for this purpose will be sent to any teacher or candidate upon request. When ordering the forms, candidates should state whether they wish to take the December, April, June, or September tests.

In order to facilitate the arrangements for the conduct of the tests, all applications should be filed as early as possible. Each application should be accompanied by the appropriate examination fee, which is four dollars for candidates who take only the Scholastic Aptitude Test and eight dollars for all other candidates.

When a candidate has failed to obtain the required blank form of application, the regular fee will be accepted if it arrives not later than the specified date and is accompanied by the candidate's name and address, the exact examination center selected, the college to which the report is to be sent, and the test or tests to be taken.

Applications and fees should reach the office of the Board not later than the dates specified in the following schedule:

* The schedule does not permit a candidate to take this test and an achievement test.

	December 1944 Series	April 1945 Series	June 1945 Series	September 1945 Series
For examination centers located				
East of the Mississippi River or on the Mississippi	Nov. 11	Mar. 17	May 12	Aug. 15
West of the Mississippi River or in Canada, Mexico, or the West Indies	Nov. 4	Mar. 10	May 5	Aug. 8
Outside of the United States, Canada, Mexico, and the West Indies	Oct. 21	Feb. 24	Apr. 21	July 25

Belated applications will be subject to a penalty fee of three dollars in addition to the regular fee.

The Board will report the results of the tests to the institutions indicated on the candidates' applications. The colleges will, in turn, notify the candidates of the action taken upon their applications for admission. Candidates will not receive reports upon their tests from the Board.

APPLICATIONS FOR ADMISSION

Applications for admission to the University should be submitted to the director of admissions, Lehigh University, Bethlehem, Pennsylvania, as early as possible during the applicant's senior year in secondary school. Appropriate forms for filing applications for admission may be secured from the director of admissions.

ACCEPTANCE OF ADMISSION AND DEPOSIT

Each candidate who is notified of admission is required to file with the office of admissions, within ten days after such notification, a formal acceptance of his admission, asserting his definite intention to enroll in Lehigh University on a specified date; and this formal acceptance must be accompanied by a deposit of $25 (check or money order payable to Lehigh University).

This deposit will be applied toward the incidental and laboratory fees and deposits for the first semester; but the deposit is forfeited in case of non-enrollment for the specified semester.

ACCREDITED SCHOOLS

Lehigh University has no permanent arrangement with any school whereby certificates are accepted in place of entrance examinations; but certificates are ordinarily accepted from first-class high schools in Pennsylvania and from schools accredited by the Middle States Association of Colleges and Secondary Schools, the New England College Entrance Certificate Board,

the Regents of the University of the State of New York, the North Central Association of Colleges and Secondary Schools, the Association of Colleges and Secondary Schools of the Southern States, and the state universities of those states having such institutions.

ADMISSION TO ADVANCED STANDING

Candidates for admission by transfer from other institutions may be admitted with advanced standing, subject to the enrollment limitations of the several divisions of the University, provided their college records up to the time of transfer are thoroughly satisfactory to the University. Such candidates must have met the entrance requirements prescribed for undergraduates of Lehigh University.

A student who desires to transfer to Lehigh University from another university, college, or junior college, must submit an official transcript of his record in the other institution; this transcript should include his college credits, a list of the entrance credits accepted for admission to the other institution, and a statement of honorable dismissal. A copy of the catalog of the college or university previously attended should be sent to the director of Admissions, Lehigh University.

A candidate who has attended more than one university, college, or junior college, must present a record from each institution; failure to submit a complete record of former academic experience will result in cancellation of registration.

Graduates of recognized colleges of liberal arts and sciences whose courses have included a year of physics, a year of chemistry, and mathematics through the calculus may ordinarily earn the degree of B.S. in engineering from Lehigh University on the successful completion of a two-year program which will be individually planned for each candidate.

A student who intends to enter an engineering curriculum at Lehigh University after graduation from college should so arrange his work in college as to cover as many as possible of the subjects of the freshman and sophomore years of the engineering curriculum he selects.

Examinations for Advanced Standing

Candidates who have completed advanced courses in approved secondary schools may, with the consent of the director of ad-

missions and of the department concerned, receive permits to take anticipatory examinations without fee to establish advanced standing on the basis of work completed in secondary schools.

Candidates for admission who wish to take examinations for advanced credit in any subject should notify the director of admissions at least one month prior to the date of registration.

ADMISSION OF SPECIAL STUDENTS

Special students may be admitted on recommendation of the director of admissions and of the director of the curriculum in which the candidate wishes to enroll, subject to the approval of the committee of admissions. Candidates must be at least twenty-one years of age and must present evidence of ability to pursue with profit the subjects that they wish to study at the University.

LATEST DATE FOR REGISTRATION

No registration of new students is accepted later than the tenth day of instruction in any semester.

VACCINATION REQUIREMENT

Smallpox vaccination is required, under the laws of the Commonwealth of Pennsylvania, for all students entering the University. Certificates are accepted for this requirement when the vaccination has been performed within three years of the time of matriculation, has resulted in a true vaccinia (take), and the scar gives evidence of a recent vaccinia. Since the vaccinations at the University are performed and the reactions read by the method recommended by the United States Public Health Service, students are advised to wait until they arrive at the University to have this done.

UNDERGRADUATE TUITION AND OTHER FEES

FIRST SEMESTER
(Payable on registration day)

Tuition fee	$200.00
Athletic fee	5.00
Health service fee	6.00
Student activities fee	2.50
Library fee	2.50
Student concerts-lectures fee	1.00
Total fees, first semester	$217.00

SECOND SEMESTER
(Payable on registration day)

Tuition fee	$200.00
Athletic fee	5.00
Health service fee	6.00
Student activities fee	2.50
Library fee	2.50
Student concerts-lectures fee	1.00
Total fees, second semester	$217.00

MATRICULATION AND GRADUATION FEES. New students pay, once only, on admission, a matriculation fee of $5.00; students at graduation pay a graduation fee of $10.00.

LABORATORY FEES AND DEPOSITS. There are also laboratory fees or deposits in laboratory courses to cover the cost of laboratory supplies used by the individual students and to provide for breakage of glassware and instruments. For convenient reference a schedule of the laboratory fees for various courses is given below. A deposit of $25.00 is made by each student taking courses in military science and tactics; this deposit is refunded when the government property issued to the student is returned.

LATE REGISTRATION FEES. The penalty for late registration is $1.00 a day up to a maximum of $5.00, for each day of delay beyond the registration days in taking out the registration ticket; and a registration not completed within three days after the date on the registration ticket is subject to a late registration fee of $1.00 a day up to a maximum of $5.00.

LABORATORY FEES AND DEPOSITS PER SEMESTER

(Unless otherwise noted, the amounts listed indicate fees which are payable and not returnable.)

Biology	
Biology	$ 3.00
Mammalian Anatomy	5.00
Comparative Anatomy of Vertebrates	3.00
Botany	3.00
Zoology	3.00
Animal Ecology	3.00
Economic Botany	3.00
Sanitary Bacteriology	3.00
Bacteriology	3.00
Biology of Bacteria	3.00
Natural History and Ecology	2.00
Histology	3.00
Advanced Bacteriology	3.00
Industrial Bacteriology	3.00
Public Sanitation	3.00

Chemistry

Note: The following amounts are all deposits and unused balances are returnable.

Chemistry Laboratory	$15.00
Elementary Chemistry and Qualitative Analysis	25.00
Quantitative Analysis	25.00 or 30.00
Assaying, Coal, Gas, and Oil Analysis	30.00
Chemical Engineering	15.00 or 25.00
Research Chemistry Laboratory	15.00
Advanced Analytical Chemistry	30.00
Radiation Methods Laboratory	10.00
Qualitative Organic Chemistry	10.00
Organic Chemistry Laboratory	30.00 or 40.00
Advanced Organic Laboratory	30.00
Industrial Biochemistry Laboratory	15.00
Chemical Engineering Practice	10.00
Physical Chemistry Laboratory	10.00
Electrochemistry Laboratory	5.00

Civil Engineering

Materials Testing Laboratory	$ 5.00
Hydraulics Laboratory	5.00
Mechanics of Materials	2.50
Hydraulics	5.00
Concrete Laboratory	5.00

Electrical Engineering

Dynamo Laboratory, Elementary	$ 6.00
Dynamo Laboratory, Intermediate	6.00
Dynamo Laboratory, Advanced	6.00 or 12.00
Dynamo Laboratory, Beginning	6.00
Dynamo Laboratory, Combined	6.00
Electrical Communication	6.00
Electric Transients	6.00

English

Contemporary Literature, book fee	$ 2.50
Dramatics	3.00
Dramatics (summer session)	5.00
Brown and White	1.00
Newspaper Reporting and Writing	2.00
Advanced Newspaper Reporting and Writing	2.00
Newspaper Editing and Copy Reading	1.50
Press Photography	3.00

Geology

Mineralogy	$ 5.00
Engineering Mineralogy	5.00
Principles of Geology	1.00
Field Geology	1.00
Petrography	3.00

Mechanical and Industrial Engineering

Engineering Laboratory	$ 6.00
Advanced Work in Engineering Laboratory	6.00

Metallurgical Engineering

Deposit:	
Thesis in Metallurgy	$10.00
Fees:	
Metallurgical Laboratory	$ 5.00
Introduction to Metallurgy	5.00
Metallurgy of Iron and Steel	5.00
Physical Metallurgy	5.00
Metallography	5.00
Electrochemical Laboratory	5.00

Mining Engineering

Deposits:	
Fuel Technology Laboratory	$10.00
Flotation	10.00
Fee:	
Ore Dressing, Coal Preparation and Laboratory	$ 5.00

Physics

Introduction to Physics	$ 6.00
General Physics Laboratory	10.00
Mechanics, Properties of Matter and Light	6.00
Dynamics and Heat	6.00
Electricity and Magnetism	6.00
Electrical Laboratory	6.00
Electric Oscillations and Electric Waves	6.00
Physical Optics and Spectroscopy	6.00
Electrical Discharge through Gases	6.00
Pyrometry	6.00
Geophysics	6.00
Advanced Laboratory	6.00

EXAMINATION FEES. Students who for satisfactory reasons were absent from final examinations will, upon petition, be allowed to take make-up examinations without payment of any examination fee. A fee of $5.00 is charged for any examination subsequent to the first regular final or make-up examination allowed upon petition in any course. This regulation applies to the psychological and placement examinations required of new students if taken at other than the scheduled date.

LATE PHYSICAL EXAMINATION FEE. Any student who fails to keep his appointment for his physical examination is charged a late examination fee at the rate of $1.00 a day up to a maximum of $5.00 until he applies for and meets another appointment; if he fails to meet the second appointment or any subsequent appointment, he again becomes subject to a similar fee.

REFUNDS. In the event that a student withdraws from the University after the payment of fees, he may elect either to receive a refund according to the schedule indicated below, or to receive credit in full in proportion to the remaining fraction of the semester if and when he returns to the University.

To the student who formally withdraws within the first week (*i. e.*, the first six days of instruction) of the semester, a refund in full will be made of tuition fee, athletic fee, student activities fee, and unused balance of laboratory fees.

To a student who formally withdraws after the first week, half of these fees will be retained, and a fraction of the other half will be refunded proportional to the remainder of the semester.

To a student who formally withdraws at any time and does not receive a refund, full credit for these fees in proportion to the fraction of the semester remaining after the withdrawal will be allowed if and when that student re-enrolls in the University.

In the event of death of a student, the above fees will be refunded in full in proportion to the fraction of the semester remaining at the time of his death.

No refunds nor credit is allowed on the health service fee, nor on the library fee. The matriculation fee is never refunded.

EXEMPTIONS. Students registered for fewer than seven semester hours are exempted from the library and health service fees. The payment of the athletic fee and the student activities fee is optional for graduate students and also for undergraduates who are registered for fewer than seven semester hours.

SPECIAL SCHEDULES. Tuition for special schedules of less than twelve hours in any semester is at the rate of $12.50 a semester hour.

STUDENT ACTIVITIES FEE. The student activities fee is appropriated as follows: Lehigh *Brown and White*, $1.75; Arcadia, $1.15; Class dues, $0.70; Mustard and Cheese Club, $0.50; Combined Musical Clubs, $0.30; Band, $0.40; debating, $0.20. For this fee each student receives a year's subscription to the semi-weekly undergraduate newspaper, tickets to each dramatic performance given by the Mustard and Cheese Club, and tickets to the concerts of the Combined Musical Clubs. In addition, this fee covers all class and student government (Arcadia) dues. The appropriation for the band and for debating represents student support of those activities.

EXPENSES

Minimum expenses for the two semesters of a college year, clothing and travel not included, are estimated at $600.00 in addition to tuition.

Expenses of undergraduates vary somewhat according to the habits and tastes of the individual students. There are certain basic expenses, however, which must be met by all students; these expenses are listed below. A schedule of necessary expenses

for the two semesters of the freshman year might be constructed as follows:

	Minimum	Average
First Semester:		
Matriculation fee	$ 5.00	$ 5.00
Health service fee	6.00	6.00
Athletic fee	5.00	5.00
Activities fee	2.50	2.50
Library fee	2.50	2.50
Student concerts-lectures fee	1.00	1.00
Tuition	200.00	200.00
*Military uniform deposit	25.00	25.00
†Physics laboratory fee	6.00	6.00
‡Chemistry deposit	15.00	15.00
Books	30.00	35.00
Supplies	15.00	20.00
Dormitory room	70.00	90.00
Board	120.00	150.00
	$503.00	$563.00
Second Semester:		
Health service fee	$ 6.00	$ 6.00
Athletic fee	5.00	5.00
Activities fee	2.50	2.50
Library fee	2.50	2.50
Student concerts-lectures fee	1.00	1.00
Tuition	200.00	200.00
‡Chemistry deposit	25.00	25.00
Books and supplies	10.00	15.00
Dormitory room	70.00	90.00
Board	120.00	150.00
	$442.00	$497.00
Total, freshman year	$945.00	$1060.00

* Returned at the end of the year.

† This may become due the second semester instead of the first.

‡ Unused portion is returned at the end of the semester.

Since three semesters are now included in each calendar year the total cost for the calendar year will amount to approximately 50% more than the cost of the two semesters of the freshman year.

The schedule above does not include drawing instruments nor slide rule. These vary in price, but adequate drawing sets may be had at $15.00, and slide rules at varying costs, $12.00 representing a fair allowance for a rule which will serve throughout the college course and in professional work.

Books, stationery, and drawing instruments may be purchased at the supply bureau in the Alumni Memorial Building.

Items of personal expense, clothes, travel, and the like cannot be estimated except for each student individually, according to his personal habits and circumstances. If a prospective student plans to accept an invitation to join a fraternity, he should anticipate an additional annual cost of approximately $90.00 plus the amount of initiation fee. The initiation fee varies considerably among the fraternities, but can always be ascertained before joining.

DORMITORIES

There are dormitory accommodations in the Henry Reese Price House, the Charles Lewis Taylor House, the Charles Russ Richards House, and the Henry Sturgis Drinker House for 453 students. Rental is from $25 to $100 a semester for each occupant. Only a limited number of the lower rental rooms is available. The policy of the University is to make these accommodations available to students in all classes. Returning students are given the first opportunity to select dormitory rooms. Immediately following this selection, the remaining rooms are available to new students. Full information regarding dormitory accommodations will be sent upon request addressed to the director of admissions.

A campus restaurant is located in Lamberton Hall. Numerous private householders in the city offer rooms and board at moderate prices; information concerning such rooms and board may be obtained from the director of admissions.

ACCELERATED PROGRAM

As a part of the war program, in order that students may complete the work for a baccalaureate degree in a shorter period of time than the conventional four years, the University has adopted an accelerated program on the basis of which students complete their work in thirty-two months.

Each semester is sixteen weeks in length, as were the semesters on the conventional basis. Acceleration has been accomplished by eliminating all vacations except one week at Christmas time and the interval of one week between each of the semesters. In this manner three semesters are provided each year. First semester courses will be taught in the summer semester extending from June to October, 1944; the second semester will extend from October, 1944 to February, 1945; the following first semester for upperclassmen will extend from February to June, 1945, with the second semester courses being taught in the semester from June to October, 1945. Adjustments have been made so that Freshmen may enter in February, June, or October and proceed to their degree more rapidly than would be the case if admission were postponed. A full program of work for entering Freshmen is offered each semester, with corresponding second semester courses the following semester.

The College of Arts and Science

THE COLLEGE OF ARTS AND SCIENCE

Administrative Officers

Clement Clarence Williams, *President of the University*
Philip Mason Palmer, *Dean of the College of Arts and Science*
Wray Hollowell Congdon, *Dean of Undergraduates*
George Bartlett Curtis, *Registrar*
Earl Kenneth Smiley, *Director of Admissions*

Faculty

Allen Jennings Barthold.....*Romance Languages*
Frank Swan Beale.....*Mathematics*
Claude Gillette Beardslee.....*Moral and Religious Philosophy*
Frank Chester Becker.....*Philosophy*
Wallace R. Biggs.....*Journalism*
Joseph Calvin Callaghan.....*English and Speech*
Glenn James Christensen.....*English*
James Lowry Clifford.....*English*
Wray Hollowell Congdon.....*Education*
Earl LaVerne Crum.....*Greek*
Edward Hutchins Cutler.....*Mathematics*
Theodore George Ehrsam.....*English*
Amos Aschbach Ettinger.....*History*
Tomlinson Fort.....*Mathematics*
Augustus Henry Fretz.....*Geology*
Lawrence Henry Gipson.....*History*
Wilson Leon Godshall.....*History and Government*
James Larmour Graham.....*Psychology*
George Dewey Harmon.....*History*
William George Hayward.....*Education*
Nicholas Hunter Heck.....*Geophysics*
Garth Ahyman Howland.....*Fine Arts*

Joseph Edward Illick.....*Mathematics*
Everett Lee Jones.....*English*
Ervand Kogbetliantz.....*Mathematics*
Kenneth Worcester Lamson.....*Mathematics*
Robert Edward Laramy.....*Education*
Voris V. Latshaw.....*Mathematics*
Lucien Tennent Lee, Jr.....*Education*
William Andrew McDonald.....*Latin*
Robert Francis McNerney.....*Romance Languages*
Herbert Grunfield Means.....*Mathematics*
Benjamin LeRoy Miller.....*Geology*
Melvin Paul Moorhouse.....*Journalism*
Robert Pattison More.....*German*
Philip Mason Palmer.....*German*
Basil Waldo Parker.....*Biology*
George Emil Raynor.....*Mathematics*
Joseph Benson Reynolds.....*Mathematics*
Albert Augustus Rights.....*English and Speech*
Edgar Heisler Riley.....*English*
Ernst Bernhard Schulz.....*Government*
David Gallup Scott.....*Romance Languages*
Jonathan Burke Severs.....*English*
Thomas Edgar Shields.....*Music*
Clarence Albert Shook.....*Mathematics*
Lloyd LeRoy Smail.....*Mathematics*
Robert Metcalf Smith.....*English*
Rafael Arcángel Soto.....*Romance Languages*
Duncan Stewart, Jr.....*Geology*
Carl Ferdinand Strauch.....*English*
Stanley Judson Thomas.....*Biology*
Francis John Trembley.....*Biology*
John Schrader Tremper.....*German*
Ralph Newcomb Van Arnam.....*Mathematics and Astronomy*
André Weil.....*Mathematics*
Lawrence Whitcomb.....*Geology*
Bradford Willard.....*Geology*
Horace Wetherill Wright.....*Latin*

THE COLLEGE OF ARTS AND SCIENCE

The College of Arts and Science of Lehigh University comprises the departments of biology, education, English, fine arts, geology, German, Greek, history and government, Latin, mathematics and astronomy, music, moral and religious philosophy, philosophy, psychology, and romance languages. Courses in economics, sociology, accounting, and finance are provided by the College of Business Administration; physics and chemistry are supplied by the College of Engineering.

The degree of Bachelor of Arts is conferred upon graduates of the College of Arts and Science.

Requirements for Graduation

1. The completion of one hundred twenty credit hours of collegiate work, apportioned so as to cover the distribution and concentration requirements, in addition to military science and tactics, moral and religious philosophy, and physical education, required of all students.

2. The passing of a comprehensive examination in the major field.

The Course of Study

Each student in the College of Arts and Science is considered from the beginning of his course as an individual. The College expects every student to have a well-defined purpose at entrance, but recognizes the student's right to change his objective and for that reason gives him two years in which to find himself and establish the direction of his future career. To help the student in his decision, the College provides an advisory staff consisting of the dean of the College, who is adviser of freshmen, and the heads of departments in which major sequences are given. The individual program for each student is outlined tentatively in an interview with the dean of the College during freshman week. This preliminary program is determined by the nature and quality of the student's preparation and by the student's personal interests. The final program, which is made out in detail at the end of the sophomore year, takes into account, in addition, demonstrated aptitudes and pre-professional or vocational needs.

These individual programs admit of considerable elective choice. The number of elective courses depends upon the demands of the distribution and concentration requirements which occupy from sixty to eighty per cent of the student's time. The number of purely elective hours ranges from twenty-one to forty-five out of the hundred and twenty required for graduation. In general, the student in the College of Arts and Science may elect any undergraduate course given at the University for which he has the prerequisites. This privilege combined with the wide choice offered by the major sequences, *i. e.*, the concentration requirements, enables the College to provide specialization in a large number of fields and preparation for individual careers.

Preparation for Professional Schools and the Professions

The College of Arts and Science provides the preliminary training necessary for admission to the various graduate schools and, in some cases, notably in teaching and journalism, prepares directly for a profession. Since a large proportion of the graduates of the College of Arts and Science of Lehigh University continue their work in graduate schools, the College offers a number of course combinations designed to give preliminary training for the various fields of medicine, dentistry, public health, law, theology, engineering, business administration, etc. Students who are looking forward toward any one of the graduate schools should consult the dean of the College, who will assist them to plan their courses. Illustrative combinations are listed below.

Preparation for Schools of Medicine, Dentistry, and Public Health

The leading medical schools require a college degree for entrance. They also demand preparation in certain subjects, specifically: from twelve to twenty-four semester hours of chemistry, at least eight semester hours of physics, and from eight to twelve hours of biology; a reading knowledge of one or more languages, usually German or French or both. The sequence of science courses outlined below is based on these requirements and includes a major in biology. In general, the College believes that the prospective physician should have a broad background and not be over specialized.

FIRST SEMESTER	FRESHMAN YEAR	SECOND SEMESTER	
Title	*Cr. Hrs.*	*Title*	*Cr. Hrs.*
Elementary Chemistry ..... or Intermediate Chemistry.	2	Stoichiometry	1
		Qualitative Analysis	3
Chemistry Laboratory	2	Mammalian Anatomy	2
Zoology	3		

FIRST SEMESTER	SOPHOMORE YEAR	SECOND SEMESTER	
Quantitative Analysis	3	Genetics	1
Quantitative Analysis Conf. ..	1		

FIRST SEMESTER	JUNIOR YEAR	SECOND SEMESTER	
Inorganic Chemistry	3	Advanced Bacteriology	3
Bacteriology	3	Comparative Anatomy	3
Introduction to Physics	3	General Physics	5

FIRST SEMESTER	SENIOR YEAR	SECOND SEMESTER	
Embryology	3	Physiology	3
Immunology	3	Histology	3
Organic Chemistry	3	Organic Chemistry	3
Organic Chemistry Laboratory.	2		

The major in public health is similar to the program arranged for pre-medical students with the exception that less anatomy is taken and in its place advanced courses in public sanitation and serology are elected.

Students looking forward to dentistry are advised to complete the four-year college course. The work prescribed is the same as for medicine. For students who are unable to spend four years in preparation, special programs covering two or three years will be arranged.

The professor of biology is the official adviser of students preparing for medicine.

Preparation for Law Schools

In general the law schools do not specify any particular preparation beyond that required for a B.A. or B.S. degree. The prospective law student should major in the field which most interests him but should at all events elect courses in English, history, government, economics, and psychology. Latin is not essential but is strongly recommended. At least one course in accounting should be elected by students who are planning to enter corporation law as a profession.

Preparation for Teaching

Students who expect to teach upon graduation should consult with the department of education early in their college course. A license or certificate is required of everyone who teaches in the public schools of Pennsylvania or of any other state. The approved certificate in Pennsylvania for college graduates is the college provisional certificate granted upon completion of twenty-one semester hours of professional or pedagogical courses (including elementary psychology) and a minimum of eighteen semester hours in each subject which the candidate expects to teach. The twenty-one semester hours of professional studies are apportioned as follows:

FIRST SEMESTER	FRESHMAN YEAR	SECOND SEMESTER	
Title	*Cr. Hrs.*	*Title*	*Cr. Hrs.*
		Psychology	3

FIRST SEMESTER	SOPHOMORE YEAR	SECOND SEMESTER	
Introduction to Teaching	3	Educational Psychology	3

FIRST SEMESTER	JUNIOR YEAR	SECOND SEMESTER	
High School Teaching	3	Education in Europe or Secondary Education or Visual Instruction	3

FIRST SEMESTER	SENIOR YEAR	SECOND SEMESTER	
Observation of Teaching	3	Practice Teaching	3

This program may be modified to meet individual needs or the specific requirements of states other than Pennsylvania.

A student who is preparing to teach should major in the subject he prefers to teach, or in education. Practice teaching is done mainly in the Bethlehem High School; but observation, practice, and substitute teaching may be done in elementary schools in Bethlehem and elsewhere. The department of physical education offers courses for students who anticipate coaching and supervision of physical education.

Preparation for Journalism

Students who plan to enter the field of journalism directly or through the medium of the Graduate School should choose for their field of concentration the major in journalism offered by the College of Arts and Science.

The program of courses required and the sequence advised is as follows:

FIRST SEMESTER	SOPHOMORE YEAR	SECOND SEMESTER	
Title	*Cr. Hrs.*	*Title*	*Cr. Hrs.*
Reporting	3	Advanced Reporting	3
Drama	3	Drama	3
Economics	3	Economics	3
Brown and White	1	Brown and White	1

FIRST SEMESTER	JUNIOR YEAR	SECOND SEMESTER	
Feature Writing or Editorial Writing	3	Newspaper Problems or History of American Journalism	3
Copyreading	3	Public Finance	3
Marketing	3	Advertising	3
National Government	3	State Government	3
American Foreign Policy	3	American Foreign Policy	3
Brown and White	1	Brown and White	1

FIRST SEMESTER	SENIOR YEAR	SECOND SEMESTER	
Editorial Writing or Feature Writing	3	History of American Journ. or Newspaper Problems	3
Labor Problems	3	Journalism Proseminar	3
Sociology	3	Sociology	3
English Elective	3	English Elective	3
Municipal Management or Elective	3	Municipal Management or Elective	3
Brown and White	1	Brown and White	1

Preparation for Public Service

There is at present in the United States a limited number of opportunities for administrative careers in the public service for men who have acquired a liberal arts degree and have done graduate work in the social sciences.

The essentials of undergraduate preparation for the several categories of public service, whether professional, scientific, administrative, or non-professional, are substantially the same as for the corresponding classifications in the field of private enterprise. The undergraduate should acquire a knowledge of political, economic, and social institutions, procedures, and processes. He should also acquire proficiency in the use of certain techniques, such as oral and written English, accounting, statistics, and library methods.

Students who are preparing for public service must meet the distribution and major requirements of the College. Two illustrative sequences based upon a major in government are listed below. Other combinations may be arranged to meet specific needs.

Preparation for the Foreign Service

FIRST SEMESTER	SOPHOMORE YEAR	SECOND SEMESTER	
Title	*Cr. Hrs.*	*Title*	*Cr. Hrs.*
European History	3	European History	3
United States History	3	United States History	3
Accounting	3	Accounting	3
		Economic Geography	3
FIRST SEMESTER	JUNIOR YEAR	SECOND SEMESTER	
American Government	3	American Government	3
Diplomacy in the 19th and 20th Centuries	3	International Politics	3
American Foreign Policy	3	American Foreign Policy	3
Statistical Method	3	Business Law	3
FIRST SEMESTER	SENIOR YEAR	SECOND SEMESTER	
International Law	3	International Law	3
Hispanic America in the 19th Century	3	Hispanic America in the 20th Century	3
Foreign Exchange	3	Banking and Credit Policies	3

The examinations for entrance into the foreign service also include one modern language (French, Spanish, or German); the history of the Far East; and commercial and maritime law.

Preparation for the Profession of City Manager

FIRST SEMESTER	SOPHOMORE YEAR	SECOND SEMESTER	
Title	*Cr. Hrs.*	*Title*	*Cr. Hrs.*
American Government	3	American Government	3
United States History	3	United States History	3
Accounting	3	Accounting	3
FIRST SEMESTER	JUNIOR YEAR	SECOND SEMESTER	
Municipal Government	3	Municipal Administration	3
Sociology	3	Sociology	3
Social Psychology	3	Public Finance	3
FIRST SEMESTER	SENIOR YEAR	SECOND SEMESTER	
Contemporary Political Thought	3	Contemporary Political Thought	3
Statistical Method	3	Public Utilities	3
Psych. of Industrial Personnel	3	Personnel Administration	3
Cost Accounting	3	Sanitary Bacteriology	3

Preparation for Engineering

If a student in the College of Arts and Science contemplates becoming a candidate for a degree in engineering after the completion of his B.A. curriculum, he should major in mathematics, business, physics, or chemistry, and choose as electives such technical studies as are contained in the earlier years of the engineering curriculum which he wishes to complete. By carefully selecting electives, with the advice and guidance of the dean of the College and the professor in charge of the engineering curriculum concerned, the graduate of the B.A. curriculum may enter the engineering curriculum chosen in full standing, and obtain his

engineering degree in one or two years of further study. A detailed plan is made for each student.

Preparation for Business Administration

Students who are looking forward to further work in an undergraduate or graduate school of business administration, or students who plan to enter business directly upon completion of their curriculum in arts and science should major in the field of their special interests but should elect at least three one-year courses in economics or business administration beyond the introductory economics.

Preparation for Actuarial Science

Students who are interested in preparation for actuarial work with insurance companies or elsewhere should plan to major in mathematics and follow the plan outlined below:

FIRST SEMESTER	FRESHMAN YEAR	SECOND SEMESTER	
Title	*Cr. Hrs.*	*Title*	*Cr. Hrs.*
Algebra and Analytic Geometry	3	Analytic Geometry and Calculus	3
FIRST SEMESTER	SOPHOMORE YEAR	SECOND SEMESTER	
Calculus	3	Intermediate Calculus	3
Mathematics of Finance	3	Mathematics of Statistics	3
Economics	3	Economics	3
FIRST SEMESTER	JUNIOR YEAR	SECOND SEMESTER	
Advanced Algebra	3	Mathematics of Life Insurance	3
Accounting	3	Accounting	3
FIRST SEMESTER	SENIOR YEAR	SECOND SEMESTER	
Finite Differences	3	Theory of Errors	3
Advanced Economics	3	Advanced Economics	3

Preparation for Other Fields

The various major sequences outlined on pages 53 to 65 provide intensive work in the subjects represented and prepare directly for graduate study.

The Curriculum

The curriculum is based upon the principles of distribution and concentration. The object of the distribution requirements is to give the student an elementary knowledge of the fields of contemporary thought and to orient him in the world of man and nature. These requirements are coordinated with the work of the preparatory schools, the number and nature of the prescribed courses to be taken in college being dependent upon the subjects presented for entrance.

The Distribution Requirements

The distribution requirements are divided into three groups.

GROUP I. HUMANITIES

1. ENGLISH. Twelve semester hours. These are normally Engl. 1 and 2, Composition and Literature, and Engl. 4 and 5, Study of the Drama. Students who demonstrate satisfactory ability in written composition in their placement examinations may satisfy this English requirement by passing Engl. 3a and 3b, Types of World Literature, or an equivalent.

2. FOREIGN LANGUAGE. A reading knowledge of Latin, Greek, French, Spanish, or German and an elementary knowledge of a second of these languages are required of all students. The requirement takes into consideration work done in the preparatory schools and may be met in the following ways:

Reading knowledge. Students may satisfy this requirement by examination; otherwise, students who offer three or four years of Latin, French, Spanish, Greek, or German at entrance satisfy this requirement by passing Lat. 1, 2, Pliny and Horace, Gk. 7, Thucydides, and Gk. 8, Tragedy, Fr. 13, 14, Types of French Literature, or Fr. 21, 22, Seventeenth and Eighteenth Century French Literature, Sp. 21, 22, Spanish Novels and Plays, or Ger. 10, Goethe's Faust, in course; those who offer only two years of Latin, Greek, French, Spanish, or German continue for two years the language presented. With the permission of the dean of the College, such students may substitute one of the other four languages. Students who offer two years of two or more languages, Latin, Greek, French, Spanish, or German, may choose from these the language they are to continue.

Elementary knowledge. The elementary knowledge may be established by examination at entrance or later, or by passing Lat. 31, Beginning Latin, and Lat. 32, Caesar, Gk. 1, 2, Elementary Greek, Fr. 1, 2, Elementary French, Sp. 1, 2, Elementary Spanish, Ital. 1, 2, Elementary Italian, or Ger. 1, 2, Elementary German, or any higher course in these languages.

3. ANCIENT CIVILIZATION OR FINE ARTS. Six semester hours. This requirement may be reduced to three hours if the student presents at entrance a year course in ancient history.

4. PHILOSOPHY OR MATHEMATICS. Six semester hours. If the student presents at entrance courses in solid geometry and plane trigonometry or equivalent the requirements may be reduced to three hours.

GROUP II. NATURAL SCIENCE

1. PHYSICAL SCIENCE. Nine semester hours to be chosen from three of the fields: chemistry, physics, geology, or astronomy. This requirement may be reduced to three hours if the student presents at entrance two of these sciences, or to six hours if he presents one.

2. BIOLOGICAL SCIENCE. Six semester hours to be selected from general biology, bacteriology, botany, paleontology, or zoology. This requirement may be reduced to three hours on the basis of entrance credit.

3. PSYCHOLOGY. Three semester hours.

GROUP III. SOCIAL SCIENCE

1. ECONOMICS. Six semester hours. The requirement may be met by entrance credit for one year of economics.

2. GOVERNMENT. Three semester hours.

3. EDUCATION, HISTORY, OR SOCIOLOGY. Nine semester hours. This requirement may be reduced to three hours on the basis of entrance credit.

Distribution requirements should be met as far as possible during the freshman and sophomore years. Electives during these years should be used as orientation courses for the purpose of enabling the student to discover his major interests.

Concentration Requirements

During the second semester of the freshman year each student must select some sequence of studies as his major field. A major consists of at least twelve semester hours of advanced work in the field chosen. Including preliminary college work, the minimum number of hours constituting a major is twenty-four. Change of major is permitted up to the end of the sophomore year. Majors must be approved by the professors concerned and the dean of the College.

The major work is designed to enable a student to master his chosen field so far as that is possible in the two years devoted to the subject. In all fields certain courses are prescribed but the mere passing of courses will not satisfy the major requirements. It is expected that the student will read widely in his subject and prepare himself largely through his own reading and his own independent work for his final comprehensive examination. After a student has selected a major subject, the head of the department in which the major is selected becomes the official adviser of the student and guides him in his choice of courses.

Comprehensive Examination

A comprehensive examination in the major subject is required of all students. This examination is given at the end of the senior year and may be oral or written or both. The comprehensive examination is given under the direction of the head of the major department; at least two university teachers, and, whenever possible, representatives of at least two departments take part in the examination.

Unscheduled Work

On the advice of the head of the department in which the major work is being done and with the consent of the dean of the College, a senior of unusual merit who wishes to concentrate in his chosen field may be allowed to substitute not more than six hours of unscheduled work per semester for six hours of elective work otherwise required for graduation.

Special Honors

Special honors are awarded at the end of the senior year, on recommendation of the head of the department concerned and by vote of the faculty, to students who have done advanced work of unusual merit in some chosen field. Candidates for special honors must indicate during their junior year their intention to work for such honors. Awards are based on grades obtained in the subject chosen, the results in extra work assigned, and the general proficiency of the candidate as evidenced by either a final examination or a thesis, as the head of the department involved may direct. No student who fails to pass his comprehensive examination with distinction is graduated with special honors.

Details of Concentration Requirements

MAJOR SEQUENCES

1. BIOLOGY. Three majors are offered by the department of biology: zoology, botany, and bacteriology.

a. Zoology. This major is designed for men who intend to enter medical school or to continue advanced instruction in a graduate school. The required courses in zoology are:

Biol. 10.	Zoology	(3)	
Biol. 2.	Mammalian Anatomy	(2)	or
Biol. 3.	Comparative Anatomy	(3)	
Biol. 6.	Botany	(3)	
Biol. 18.	Genetics	(2)	
Biol. 54.	Bacteriology	(3)	
Biol. 104.	Embryology	(3)	
Biol. 153.	Advanced Bacteriology	(3)	
Biol. 20.	Physiology	(3)	
Biol. 113.	Histology	(3)	
Biol. 158.	Immunology	(3)	

b. Botany. This major is for men who intend to enter the teaching profession, or to do research in agriculture or in the economic phases of the science. The required courses are:

Biol. 10.	Zoology	(3)
Biol. 6.	Botany	(3)
Biol. 18.	Genetics	(2)
Biol. 54.	Bacteriology	(3)
Biol. 36.	Economic Botany	(3)

c. Bacteriology. This major is for men who intend to go into public health work or bacteriology either upon graduation or in pursuance of graduate study. The required courses are:

Biol. 10.	Zoology	(3)
Biol. 6.	Botany	(3)
Biol. 18.	Genetics	(2)
Biol. 54.	Bacteriology	(3)
Biol. 153.	Advanced Bacteriology	(3)
Biol. 113.	Histology	(3)
Biol. 158.	Immunology	(3)
	Optional	
Biol. 155.	Industrial Bacteriology	(3)
Biol. 161.	Public Sanitation	(3)

All students taking a biology major will elect the following courses as collateral subjects: Chem. 1, 8, 9, 11, 20, 30, 41, 150, 151, and 165; Physics 12, 16, and 17. A reading knowledge of both French and German should be attained before graduation.

2. Chemistry

Chem.	1 or 3.	Elementary Chemistry or Inter. Chem...(2)
Chem.	11 or 13.	Chemistry Laboratory .....(2)
Chem.	8.	Stoichiometry .....(1)
Chem.	20.	Qualitative Analysis .....(3)
Chem.	6.	Inorganic Chemistry .....(3)
Chem.	7.	Physical Chemistry .....(3)
Chem.	30, 31.	Quantitative Analysis .....(6)
Chem.	41, 45.	Quantitative Analysis Conference.....(2)
Chem.	150, 151.	Organic Chemistry .....(6)
Chem.	165, 167.	Organic Chemistry Laboratory .....(4)
Chem.	190.	Physical Chemistry .....(3)
Chem.	193.	Physical Chemistry Laboratory .....(2)
Chem.	194.	Physical Chemistry and Electrochemistry.(3)
Chem.	197.	Electrochemistry Laboratory .....(1)

Required Collateral Courses

Phys.	12.	Introduction to Physics .....(3)
Phys.	16.	General Physics .....(3)
Phys.	17.	General Physics Laboratory .....(2)
Math.	11.	Algebra and Analytic Geometry.....(3)
Math.	12.	Analytic Geometry and Calculus.....(3)
Math.	13.	Calculus .....(3)

Suggested Electives

Chem.	158, 159.	Advanced Organic Chemistry .....(6)
Gk.	99.	Ancient Science .....(3)

3. Business Administration and Economics

A. Major in Social Institutions

SOPHOMORE YEAR

Eco.	3, 4.	Economics .....(6)

JUNIOR YEAR

Soc.	51.	Social Institutions .....(3)
Fin.	126.	Public Finance .....(3)
Eco.	107, 108.	Advanced Economics .....(6)
E.S.	145.	Statistical Method .....(3)
E.S.	146.	Business Cycles and Forecasting.....(3)

SENIOR YEAR

Eco.	133, 134.	Labor Problems .....(6)
Soc.	161, 162.	Sociology and Social Problems.....(6)
Soc.	171, 172.	Readings in Sociology .....(6)

Suggested Electives

Fin.	135.	Transportation .....(3)
Fin.	136.	Public Utilities .....(3)
Govt.	157.	Municipal Government .....(3)
Govt.	158.	Municipal Administration .....(3)
Psych.	104.	Social Psychology .....(3)
Govt.	62.	International Relations .....(3)
Journ.	18.	History of American Journalism .....(3)

B. Major in Economics

SOPHOMORE YEAR

Eco.	3, 4.	Economics .....(6)

JUNIOR YEAR

Eco.	107, 108.	Advanced Economics	(6)
Fin.	29, 30.	Money and Banking	(6)
E.S.	145.	Statistical Method	(3)
E.S.	146.	Business Cycles and Forecasting	(3)

SENIOR YEAR

Fin.	135.	Transportation	(3)
Fin.	136.	Public Utilities	(3)
Eco.	60.	Insurance	(3)
Fin.	126.	Public Finance	(3)
Eco.	133.	Labor Problems	(3)
Soc.	162.	Social Problems	(3)

Suggested Electives

Eco.	11, 12.	Marketing	(6)
I.E.	2, 3.	Industrial Management	(6)
Soc.	161.	Sociology	(3)
Govt.	62.	International Relations	(3)
Govt.	157.	Municipal Government	(3)
Govt.	158.	Municipal Administration	(3)

C. Major in Finance

SOPHOMORE YEAR

Eco.	3, 4.	Economics	(6)

JUNIOR YEAR

Fin.	21, 22.	Corporation Finance	(6)
Fin.	29, 30.	Money and Banking	(6)
E.S.	145.	Statistical Method	(3)
E.S.	146.	Business Cycles and Forecasting	(3)

SENIOR YEAR

Fin.	123.	Investments	(3)
Fin.	126.	Public Finance	(3)
Fin.	135.	Transportation	(3)
Fin.	136.	Public Utilities	(3)
Eco.	60.	Insurance	(3)
Eco.	134.	Labor Problems	(3)

Suggested Electives

Acctg.	1, 2.	Accounting	(6)
Acctg.	113, 114.	Advanced Accounting	(6)
Eco.	107, 108.	Advanced Economics	(6)
Eco.	133.	Labor Problems	(3)
Fin.	131.	Foreign Trade and Exchange	(3)
Fin.	132.	Banking and Credit Policies	(3)
Fin.	171, 172.	Readings in Finance	(6)

D. Major in Accounting

SOPHOMORE YEAR

Eco.	3, 4.	Economics	(6)
Acctg.	1, 2.	Accounting	(6)

JUNIOR YEAR

Acctg.	115.	Cost Accounting	(3)
Acctg.	118.	Advanced Cost Accounting	(3)
Fin.	21, 22.	Corporation Finance	(6)
Law	2.	Business Law	(3)

SENIOR YEAR

Acctg. 113, 114.	Advanced Accounting	(6)
Law 103.	Federal Tax Law	(3)
Law 102.	Business Law	(3)
Acctg. 120.	Auditing	(3)

Suggested Electives

*Acctg. 171.	Readings in Accounting	(3)
E.S. 145.	Statistical Method	(3)
E.S. 146.	Business Cycles and Forecasting	(3)
Eco. 107, 108.	Advanced Economics	(6)
I.E. 2, 3.	Industrial Management	(6)
C.E. 100.	Engineering Valuation and Economy	(3)
*Fin. 123.	Investments	(3)

* Essential for students preparing for C.P.A. work.

4. Education

Educ. 1.	Introduction to Education	(3)
Educ. 20.	Educational Psychology	(3)
Educ. 51.	Principles of High School Teaching	(3)
Educ. 53.	Observation of Secondary School Teaching	(3)
Educ. 54.	Practice Teaching of Sec. School Subjects	(3)
Educ. 131.	History of Education in the United States	(3)
Educ. 150.	Principles of Secondary Education	(3)
Educ. 151.	Organization of Materials of Instruction	(3)
	Electives	(6)

5. English

A. English Literature

Students looking forward to teaching English, or taking graduate courses for advanced degrees, should register for Engl. 123, 124, and elect eighteen additional hours from the list below. Students wishing to prepare a thesis for honors should elect in addition Engl. 81, 82.

Engl. 81, 82.	Undergraduate Thesis	(6)
Engl. 83, 84.	Readings in English Literature	(6)
Engl. 123, 124.	Shakespeare and the Elizabethan Drama	(6)
Engl. 125.	English Literature of the Romantic Era.	(3)
Engl. 126.	English Literature of the Victorian Era.	(3)
Engl. 130.	The Renaissance	(3)
Engl. 131.	Milton	(3)
Engl. 133.	Restoration and Augustan Literature	(3)
Engl. 134.	Age of Johnson	(3)

B. English and Journalism

Students who do not expect to specialize in English language and literature, but are interested in taking a major in English that may include courses in dramatics and journalism should arrange for twenty-four hours from the list below, twelve hours of which shall be from the "100" group. Students wishing to prepare a thesis for honors should elect in addition Engl. 81, 82.

Engl. 121.		Contemporary American Literature.....(3)
Engl. 122.		Contemporary English Literature.....(3)
Engl. 123,	124.	Shakespeare and the Elizabethan Drama.(6)
Engl. 125.		English Literature of the Romantic Era.(3)
Engl. 126.		English Literature of the Victorian Era.(3)
Journ. 21.		Writing for Publication.....(3)
Journ. 22.		The Short Story .....(3)
Engl. 8,	9.	English Literature .....(6)
Engl. 18,	19.	The Novel .....(6)
Engl. 20.		American Literature, 1607-1855.....(3)
Engl. 21.		Modern American Literature.....(3)
Engl. 81,	82.	Undergraduate Thesis .....(6)
Engl. 83,	84.	Readings in English Literature.....(6)
Speech 61,	62.	Dramatics .....(6)
Journ. 15.		Editorial Writing and Modern Problems..(3)
Journ. 14.		Newspaper Feature Writing and News Photography .....(3)
Journ. 18.		History of American Journalism.....(3)

C. Journalism

The prerequisites for a major in journalism are Engl. 1 and 2, Freshman Composition, or Engl. 3a and 3b, Types of World Literature.

The major proper is elected from the following courses:

	English Literature .....(6)
Journ. 11.	Newspaper Reporting and Writing.....(3)
Journ. 12.	Advanced Newspaper Reporting and Writing..(3)
Journ. 13.	Newspaper Editing and Copyreading.....(3)
Journ. 14.	Newspaper Feature Writing and News Photography .....(3)
Journ. 15.	Editorial Writing and Modern Problems....(3)
Journ. 16.	Newspaper Problems and Policies.....(3)
Journ. 20.	Journalism Proseminar .....(3)
Journ. 1-4	*Brown and White* four semesters.....(4)

The collateral courses suggested for the major in journalism are as follows: Eco. 3, 4, Economics; Soc. 161, 162, Sociology; Govt. 51, 52, American Government; Hist. 25, 26, Modern European History; or Hist. 129, 130, American Foreign Policy; and one of the following: Govt. 157, Municipal Government; Govt. 158, Municipal Administration; Eco. 133, 134, Labor Problems; or Eco. 11, Marketing, and Eco. 113, Advertising.

6. Fine Arts

A student majoring in fine arts is expected to have the introductory courses, F. A. 11, Ancient and Medieval Art, and F. A. 12, The Art of the Italian Renaissance.

The major proper consists of the following:

F.A. 3,	4.	History of Architecture.....(6)
F.A. 13.		The Art of the Northern Renaissance.....(3)
F.A. 14.		Modern Art .....(3)
F.A. 17,	18.	Criticism and Analysis of Art.....(6)

Freehand Drawing (F. A. 5, 6) and Prints and Print Processes (F. A. 19) are not required of students majoring in fine arts but are recommended as a help toward appreciation. As collateral courses Mus. 3, 4, Appreciation of Music, and Phil. 109, The Theory of Art and of Beauty are advised. Students should have as much background in history as possible and a reading knowledge of a foreign language is valuable.

7. Geology

The prerequisites for students majoring in geology are: Geol: 10, Principles of Geology, Geol. 1, Mineralogy, Geol. 5, Petrology, Geol. 8, Historical Geology, altogether a total of 11 or more hours. These prerequisites should be completed by the end of the sophomore year.

The major proper consists of the following courses:

Geol. 107.	Non-metallic Economic Geology	(2)
Geol. 108.	Metallic Economic Geology	(3)
Geol. 109.	Paleontology	(3)
Geol. 110.	Stratigraphy and Sedimentation	(3)
Geol. 111.	Field Geology	(2)
Geol. 114.	Structural Geology	(3)
Geol. 116.	Geology Proseminar	(1)
Geol. 118.	Geology of Mineral Fuels	(3)

Certain variations in the major courses are advised depending upon the branch of geology in which the individual student is particularly interested. The same factor will affect materially the collateral courses advised. Students majoring in geology should consult the department head on these matters.

Geol. 109, 110, 114 should be taken during the junior year, and Geol. 107, 108, 111, and 118 during the senior year. The Geology Proseminar, Geol. 116, is taken during each semester of the senior year and is recommended also during each semester of the junior year. Other available courses are: Geol. 9, Engineering Geology, Geol. 18, Meteorology and Climatology, Geol. 101, Applied Mineralogy Laboratory, Geol. 117, Geochemistry, Geol. 123, Optical Crystallography, Geol. 124, Petrography, Geol. 128, Crystal Structure, and Geol. 171 and 172, Geological Problems.

8. German

The prerequisite for a major in German is Ger. 10, Goethe's Faust, Part I, or a knowledge of German which is equivalent.

The major proper consists of the following courses:

Ger. 22.	Conversation and Composition	(3)
Ger. 111, 112.	Nineteenth Century German Drama	(6)
Ger. 113, 114.	Lessing, Goethe, and Schiller	(6)
Ger. 115, 116.	The German Short Story	(6)

Shakespeare, Engl. 123, 124, and European History, Hist. 25, 26, are recommended as collateral courses. A thorough knowledge of Latin is desirable.

In addition to the collateral reading assigned in connection with the major courses, the students will be expected to have a knowledge of the history of German literature. A list of readings in English and German is furnished the student at the beginning of his major work.

9. Greek

The major in Greek for those students who have begun Greek in college consists of the following courses:

Gk. 1, 2.	Elementary Greek	(6)
Gk. 3, 4.	Second-year Greek	(6)
Gk. 7.	Thucydides	(3)
Gk. 8.	Greek Tragedy	(3)
Gk. 15.	Homer and Herodotus	(3)
Gk. 16.	Plato	(3)

or equivalent courses as offered.

Students who have presented the full amount of preparatory Greek at entrance will take Gk. 15, 16, 7, and 8 in the freshman and sophomore years, and Gk. 9, Dramatic Poetry, Gk. 10, Greek Oratory, Gk. 11, Homer, Gk. 12, Lyric Poetry, or Gk. 13, Hellenistic Greek, during the last two years.

10. History and Government

All students majoring in history and government are recommended to elect Hist. 25 and 26, European History. This should be done as early as possible.

The following groups are offered by the department in fulfillment of the major requirement:

a. The American History group. Those selecting the American history group will be expected to register for (a) Hist. 13 and 14, United States History; (b) Hist. 27 and 28, European Expansion and Empire Building; (c) Hist. 129 and 130, American Foreign Policy, or Hist. 139 and 140, The American Civil War and the Reconstruction of the Union, or Hist. 149 and 150, Hispanic America in the Nineteenth and Twentieth Centuries; (d) Hist. 119 and 120, Senior Proseminar, which will study the British Empire before the American Revolution.

b. The European History Group. Those selecting the European history group will be expected to register for (a) Hist. 25 and 26, European History; (b) Hist. 29 and 30, Modern Europe, or Hist. 115 and 116, Political and Social History of England; (c) Hist. 27 and 28, European Expansion and Empire Building, or Hist. 119 and 120, the Senior Proseminar on the British Empire before the American Revolution; (d) Hist. 135 and 136, The Cultural History of Western Europe.

c. The Government Group. Those selecting the government group will be expected to register for (a) Govt. 51 and 52, American Government (National and State); (b) Govt. 163 and 164, Contemporary Political Thought; (c) twelve hours from the following group of courses: Govt. 61 and 62, Diplomacy in the Nineteenth and Twentieth Centuries and International Politics; Govt. 151, The American Constitutional System; Govt. 157 and 158, Municipal Government and Administration; Govt. 161 and 162, International Law; Hist. 119 and 120, Proseminar; Hist. 129 and 130, American Foreign Policy, Hist. 160, History of American Political Parties.

d. The International Relations Group. Those selecting the international relations group will be expected to register for Govt. 1, The Foundations of Government and Hist. 29 and 30, Modern Europe. For the comprehensive examinations choose one subject out of the following groups: (a) Govt. 61 and 62, Diplomacy and International Relations, one year preceding (b) Govt. 161 and 162, International Law; (c) Hist. 129 and 130. American Foreign Policy; or Hist. 149 and 150, Hispanic America in the Nineteenth and Twentieth Centuries; or Hist. 179 and 180, The Far East Since 1800; (d) Hist. 27 and 28, European Expansion and Empire Building, or Hist. 119 and 120, The British Empire in the Eighteenth Century.

11. Latin

Students majoring in Latin will be expected to present as preliminary work Lat. 1a, Pliny, or 1b, Vergil; Lat. 2, Horace; Lat. 4, Livy, and Lat. 13, Latin Drama, or equivalent. The major proper consists of the following courses: Lat. 105, Satire, Lat. 106, Roman Prose Writers of the Empire, Lat. 107, *Æneid,* Books VII-XII, and Lat. 108, Lucretius. The courses are given in alternate years, and are open to both juniors and seniors.

In addition to the courses specified above, students majoring in Latin must elect Lat. 125, Latin Literature in English Translation, and are advised to elect (preferably in the junior year) the course in Ancient History (Lat. 21 and 22). Instead of Lat. 22, majors may elect Lat. 121 and 122, the advanced courses in Roman History.

12. Mathematics

A. The Major in Mathematics

The formal requirement of the major in mathematics is thirty semester hours of college credit in mathematics. This must include Math. 106, Advanced Calculus, and Math. 51, Advanced Algebra. The twelve hours advanced credit required by the regulations of the College of Arts and Science must be from mathematics courses given at Lehigh University other than Math. 1, 1a, 1b, 11, 11a, 12, 13, 14, 15, 16, 20, 23, and 40.

B. The Major in Mathematics and Astronomy

The major in mathematics and astronomy consists of thirty semester hours of college credit in mathematics and astronomy. It must include Math. 14, Intermediate Calculus, Astr. 2, General Astronomy, and Astr. 3, Practical Astronomy. The twelve hours advanced credit required shall not include Math. 1, 1a, 1b, 11, 12, 13, 14, 15, 16, or Astr. 1.

C. The Major in Actuarial Science

A major in actuarial science is offered within the department of mathematics. The graduate should be able to pass the examinations for associate in the Actuarial Society of Ameirca. The major consists of Math. 11, 12, 13, 14, 15, 40, 42, 43, 51, 124, Acctg. 1, 2, Fin. 25, Eco. 3, 4, 107, and 108.

13. Philosophy

The subject of philosophy may be chosen as a major on one of these two distinct bases:

(1) The student may recognize philosophy as the study of how to correlate his other studies, so that each of them may profit by the inspiration and the standard of criticism that comes from a unified outlook. Such a student should, as a rule, give about twelve hours to philosophy, including the History of Philosophy (6), with either Logic or Ethics (3), and either the Theory of Nature, the Theory of Art and of Beauty, or the Theory of Social Relations (3).

(2) The student who is drawn to philosophy as a culminating study may well give to it as many as twenty-four hours, including the subjects mentioned above, with six hours in Contemporary Philosophy and six hours in "Readings." The actual selection will vary with the individual student.

14. Physics

Students majoring in physics should offer as prerequisite courses Phys. 12, Introduction to Physics, Phys. 16, General Physics. Phys. 17, General Physics, Laboratory, or preferrably, Phys. 22, Mechanics and Light, Phys. 23, Dynamics and Heat, and Phys. 24, Electricity and Magnetism, and mathematics including Elementary Calculus, Math. 13.

A total of at least twelve hours of physics should be elected during the junior and senior years from the following courses:

JUNIOR YEAR

Phys. 120.	Electric Oscillations and Waves	(3)
Phys. 122.	Physical Optics and Spectroscopy	(3)
Phys. 124.	Electric Discharge through Gases	(3)
Phys. 126.	Pyrometry	(3)

SENIOR YEAR

Phys. 160, 161.	Intro. to Modern Physical Theories	(6)
Phys. 162, 163.	Intro. Theo. of Electricity and Magnetism.	(6)
Phys. 164, 165.	Advanced Laboratory	(2)

15. Psychology

The following recommendations are presented as a guide to majors in the department of psychology. The student may select any one of the following three fields.

I. General Psychology

Designed to prepare for graduate work in the field.

(1) Required courses.

a. In psychology:

Psych. 1. Elementary Psychology .....(3)
Psych. 102. Aptitude Testing .....(3)
Psych. 110. Learning and Motivation .....(3)
Psych. 131. Neurological Aspects of Behavior.....(1)
Psych. 132. Sensory Psychology .....(2)
Psych. 133. Complex Psychological Processes.....(3)

and a minimum of nine hours to be selected from:

Psych. 15. Industrial Psychology .....(3)
Psych. 16. Psychology in Business.....(3)
Psych. 51. Readings in Psychology .....(3)
Psych. 101. Psychology of Industrial Personnel.....(3)
Psych. 104. Social Psychology .....(3)
Psych. 108. Genetic Psychology .....(3)
Psych. 109. Abnormal Psychology .....(3)
Psych. 111. Minor Research .....(3)
Psych. 112. Minor Research .....(3)
Psych. 117. Personality .....(3)

b. In a non-psychological subject: a three-hour course in a supporting field approved by the head of the department.

(2) Collateral subjects recommended: Math. 42, Mathematics of Statistics, six hours of biology, and elementary physics.

II. Applied Psychology

Designed to prepare for psychological work in business and industry.

(1) Required courses.

a. In psychology:

Psych. 1. Elementary Psychology .....(3)
Psych. 102. Aptitude Testing .....(3)

and in addition six hours to be selected from:

Psych. 104. Social Psychology .....(3)
Psych. 110. Learning and Motivation .....(3)
Psych. 131. Neurological Aspects of Behavior.....(1)
Psych. 132. Sensory Psychology .....(2)
Psych. 133. Complex Psychological Processes.....(3)

and six hours to be selected from:

Psych. 15. Industrial Psychology .....(3)
Psych. 16. Psychology in Business.....(3)
Psych. 101. Psychology of Industrial Personnel.....(3)
Psych. 111. Minor Research .....(3)
Psych. 112. Minor Research .....(3)
Psych. 117. Personality .....(3)

b. In non-psychological subjects: not more than six hours in advanced subjects in allied fields. These must be approved by the head of the department.

(2) Collateral subjects recommended for this group are selected, in conference with the head of the department, in accord with the interests and goals of each student.

III. Social Science Psychology

Designed to give cultural background, or to prepare for social service or governmental work.

(1) Required courses:

a. In psychology:

Psych. 1. Elementary Psychology .....(3)
Psych. 104. Social Psychology .....(3)

and in addition six hours to be selected from:

Psych. 108. Genetic Psychology .....(3)
Psych. 110. Learning and Motivation .....(3)
Psych. 131. Neurological Aspects of Behavior.....(1)
Psych. 132. Sensory Psychology .....(2)
Psych. 133. Complex Psychological Processes.....(3)

and six hours to be selected from:

Psych. 102. Aptitude Testing .....(3)
Psych. 109. Abnormal Psychology .....(3)
Psych. 117. Personality .....(3)

b. In non-psychological subjects: not more than six hours in advanced subjects in allied fields. These must be approved by the head of the department.

(2) Collateral subjects recommended for this group are selected in conference with the head of the department. They are designed to provide for the specific needs of students who are interested in cultural content; social sciences; governmental, journalistic, economic, or social service work.

16. Romance Languages

A. French

The prerequisites for students majoring in French are: Fr. 21, Seventeenth Century French Literature, and Fr. 22, Eighteenth Century French Literature.

The major proper consists of the following courses:

Fr. 31, 32. Nineteenth Century French Literature.....(6)
Fr. 101. French Literature before the Seventeenth Century .....(3)
Fr. 102. Contemporary French Literature.....(3)
Fr. 103, 104. Proseminar .....(6)

Recommended as collateral courses are the following:

Gk.	100.	Greek Literature in English Translation..(3)
Lat.	125.	Latin Literature in English Translation..(3)
Engl.	123, 124.	Shakespeare and the Elizabethan Drama..(6)
Hist.	135, 136.	The Cultural History of Western Europe.(6)

The student will be expected to complete supplementary readings, the list of which he will receive at the beginning of his major work, and to correlate the knowledge gained in courses and readings through the use of some recommended history of French literature.

B. Spanish

The prerequisites for students majoring in Spanish are Sp. 21, 22, Spanish Novels and Plays.

The major proper consists of the following courses:

Span.	101.	Spanish Fiction of the Sixteenth and Seventeenth Centuries .....(3)
Span.	102.	Spanish Drama of the Sixteenth and Seventeenth Centuries .....(3)
Span.	103, 104.	Proseminar .....(6)
Span.	111, 112.	Spanish-American Literature .....(6)

Recommended as collateral courses are the following:

Gk.	100.	Greek Literature in English Translation..(3)
Lat.	125.	Latin Literature in English Translation..(3)
Engl.	123, 124.	Shakespeare and the Elizabethan Drama..(6)
Hist.	135, 136.	The Cultural History of Western Europe.(6)
Hist.	149.	Hispanic America in the Nineteenth Century .....(3)

In addition to the outside readings and reports required in connection with these courses, the students will be expected to acquire a knowledge of the history of Spansh literature as a whole.

Special Regulations for English

Students in the College of Arts and Science who persistently use poor English may be reported at any time to the dean of the College. He may require that they take additional English without credit toward graduation. Toward the end of the junior year each junior in the College of Arts and Science must report to the department of English for an exercise in impromptu writing. Students found seriously deficient in this test are reported to the dean of the College, who may require that they take additional English without credit toward graduation.

The College of Business Administration

THE COLLEGE OF BUSINESS ADMINISTRATION

Administrative Officers

Clement Clarence Williams, *President of the University*

Neil Carothers, *Dean of the College of Business Administration*

Wray Hollowell Congdon, *Dean of Undergraduates*

George Bartlett Curtis, *Registrar*

Earl Kenneth Smiley, *Director of Admissions*

Faculty

Carl Elmer Allen.....*Accounting*

Frederick Alden Bradford.....*Finance*

Neil Carothers.....*Economics and Sociology*

Roy Burford Cowin.....*Accounting*

Herbert Maynard Diamond.....*Economics and Sociology*

THE COLLEGE OF BUSINESS ADMINISTRATION

The purpose of the curriculum in business administration is to provide a thorough and systematic training in the fundamentals of business. The College of Business Administration at Lehigh is comparatively new, and it has been possible to build the curriculum on the basis of the experience of other colleges of the kind.

The College of Business Administration undertakes, in its four-year curriculum, to provide a training in the fundamentals of business that will give the student an intelligent understanding

of business principles, an ability to analyze industrial facts, and a habit of thought that will enable him to cope with the problems that increasing executive responsibilities will bring him in later life. A college course cannot make business executives and industrial managers out of inexperienced college students, and no college course can provide a substitute for the training and experience which are to be gained only from actual contact with the complex problems of business. The College of Business Administration does not pretend to furnish such a substitute but to lay a foundation upon which a career in the field of business activity may be built.

In accordance with this plan of training in fundamentals, the student is required to learn the basic principles that underlie all business. No student is permitted to omit the courses in economics, economic history, accounting, corporation finance, money and banking, and statistical method which are fundamental to all business. Many students come to college with their choice of a future profession or field of business already determined, although this choice is often predicated upon the most inadequate grounds. The insistence of the business administration curriculum on an elementary training in all the fundamentals gives the student an invaluable means of discovering his real abilities and making a final choice of a profession. A major function of the curriculum in business administration is to aid students in their efforts to discover their best talents.

In addition to this principle of a generalized training in business fundamentals, there is an equally important principle that the training as a whole shall offer an education commensurate with the standards of a university. The curriculum permits no student to devote himself exclusively to business subjects. He must acquire at least a rudimentary acquaintance with the cultural and humanitarian aspects of the world around him, as well as at least a brief contact with science. Consequently a large part of the curriculum is devoted to work in liberal and scientific subjects. In the freshman year only one course is taken in the College of Business Administration. In the sophomore year the curriculum offers only two courses in business administration. Throughout the entire four years' work there is emphasis on the social aspects of the subjects considered. If a student develops alongside his business work a special interest in some such field as languages or

science, he is given opportunity, through electives or substitutions, to pursue this special line. Many students have, at graduation, done three or four years work in languages or chemistry or some such subject outside the business curriculum proper.

It has been emphasized that training in fundamentals constitutes the major objective of the curriculum. Specialization in one field of business at the expense of general training is not possible, while purely vocational and wholly commercial aspects of business are excluded from the curriculum. But every student has opportunity in the last two years, and especially in the senior year, to concentrate his work in some special field of business. The curriculum is so arranged that every student necessarily specializes in some degree, but these requirements give the student a wide choice of fields of work and combinations of courses.

Students planning careers in accounting take elementary accounting in their sophomore year. In their junior year they take cost accounting and advanced accounting, as well as the required courses in statistics, corporation finance, and money and banking, all of which are essential courses in connection with accounting. In the senior year they take one or more of the advanced courses in accounting and in addition usually elect investments, public finance, and business law. A student following this program of work has not specialized in accounting to the detriment of his general training, but he has the necessary background for a career in this field. Graduates of the College of Business Administration have been consistently successful in accounting, both public and private. Holders of the degree are eligible for work toward a C. P. A. certificate in any state.

Those students preparing for the managerial phases of business select courses to fit in with their particular individual needs. Normally they order their program so as to include labor problems, marketing, advertising, and industrial management. Students planning a career in merchandising usually arrange their curriculum to include the junior and senior courses in marketing, selling and sales management, and advertising, as well as business law and courses in psychology and in English. Students preparing for careers in the field of finance or investments take the courses in investments, public finance, banking and credit policies, and public utilities.

For students who are interested in the social and public aspects of business, with a view to pursuing graduate work in economics or to entering government service, an individual program is worked out from the courses in advanced economics, sociology, labor problems, and courses in government and history in the College of Arts and Science. It is now widely recognized that business curricula of the better type offer excellent preparation for law. Graduates of the College of Business Administration are accepted without question by the outstanding law schools of the country.

The College of Business Administration has certain other distinguishing features. One of these is the limited enrollment. The graduating class is relatively small, and all its members are known personally to the teaching staff. This gives every student exceptional opportunity to consult with individual professors in reference to his future work.

Perhaps the most distinctive feature of the work at Lehigh in business administration is the character of the class-work. Much of the work of the curriculum is taken in the College of Engineering and the College of Arts and Science, while students of these two Colleges in very large numbers avail themselves of the courses given in the College of Business Administration. There is no segregation of students by colleges, and students in business administration take their courses in competition with students trained in liberal arts and in the exact sciences. This condition has a marked influence on the standards of work and the quality of the student.

In times of normal business activity, students who have made creditable records may reasonably expect to receive one or more offers of positions before the date of their graduation. The College of Business Administration enjoys happy relations with many of the country's leading industries. Representatives regularly visit the campus to engage the service of students graduating in business administration. The University assumes no responsibility for finding positions for its graduates, but every effort is made by the College and by the university placement service to put its graduating students in touch with desirable opportunities for employment.

Graduates of this curriculum receive the degree of Bachelor of Science in Business Administration.

The Curriculum in Business Administration

Total Hours Required for Degree of B.S. in Business Administration: 128

I. REQUIRED COURSES (56 Hrs.)

Course No.	*Course Title*	*Cr. Hrs.*	*Course No.*	*Course Title*	*Cr. Hrs.*
Acctg. 1	Accounting	3	Math. 40	Math. of Finance.	3
Acctg. 2	Accounting	3	Mil. 1	Military Science	2
Eco. 1	Ind. Evolution	3	Mil. 2	Military Science	2
Eco. 3	Economics	3	Mil. 3	Military Science	2
Eco. 4	Economics	3	Mil. 4	Military Science	2
Eco. 11	Marketing	3	Biol. 15	Fr. Hygiene	—
Eco. 50	Eco. Geography	3	M.R.Phil. 10	Student Philosophy	—
Engl. 1 or 3a	Composition	3	P.E. 1	Physical Education	—
Engl. 2 or 3b	Composition	3	P.E. 2	Physical Education	—
E.S. 145	Stat. Method	3	P.E. 3	Physical Education	—
E.S. 146	Bus. Cycles	3	P.E. 4	Physical Education	—
Fin. 21	Corp. Finance	3	P.E. 5	Physical Education	—
Fin. 22	Corp. Finance	3	P.E. 6	Physical Education	—
Fin. 33	Money & Banking	3	P.E. 7	Physical Education	—
Math. 1b	General Math	3	P.E. 8	Physical Education	—

II. ADVANCED BUSINESS ADMINISTRATION OPTIONS (30 Hrs.)

Course No.	*Course Title*	*Cr. Hrs.*	*Course No.*	*Course Title*	*Cr. Hrs.*
Acctg. 113	Adv. Accounting	3	Fin. 123	Investments	3
Acctg. 114	Adv. Accounting	3	Fin. 124	Investments	3
Acctg. 115	Cost Accounting	3	Fin. 126	Public Finance	3
Acctg. 118	Adv. Cost Acctg.	3	Fin. 131	Foreign Exchange.	3
Acctg. 120	Auditing	3	Fin. 132	Bkg. & Credit Pol.	3
Acctg. 171	Readings in Acctg.	3	Fin. 135	Transportation	3
Acctg. 172	Readings in Acctg.	3	Fin. 136	Public Utilities	3
Eco. 12	Marketing	3	Fin. 171	Readings in Fin.	3
Eco. 60	Eco. of Insurance.	3	Fin. 172	Readings in Fin.	3
Eco. 107	Adv. Economics	3	I.E. 2	Industrial Mgt.	3
Eco. 108	Adv. Economics	3	I.E. 3	Industrial Mgt.	3
Eco. 113	Advertising	3	Law 2	Business Law	3
Eco. 114	Sell. & Sales Mgt.	3	Law 102	Business Law	3
Eco. 133	Labor Problems	3	Law 103	Fed. Tax Law	3
Eco. 134	Labor Problems	3	Soc. 51	Social Institutions.	3
Eco. 171	Readings in Eco.	3	Soc. 161	Sociology	3
Eco. 172	Readings in Eco.	3	Soc. 162	Sociology	3
E.S. 147	Stat. Analysis	3	Soc. 171	Readings in Soc.	3
E.S. 148	Adv. Bus. Cycles	3	Soc. 172	Readings in Soc.	3

III. OPTIONAL AND ELECTIVE COURSES (30 Hrs.)

English or Foreign Language (12 hrs.) Science (6 hrs.)
Arts Options (12 hrs.) Free Electives (12 hrs.)

The Science Options are Biology 7, 8, 11, 13; Chemistry 2-12, 20; Geology 16, 17, 10, 8; Physics 12, 16. The Arts Options are courses in History and Government, Mathematics, Philosophy, and Psychology (not more than 6 hours in one group). For the English or foreign language option, either English or foreign languages or a combination of both may be offered, but not less than six credit hours of a single elementary foreign language may be presented.

A normal schedule for graduation would be as follows:

FRESHMAN YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr. Hrs.*	*Number*	*Title*	*Cr. Hrs.*
Eco. 1	Ind Hist	3	Eco. 50	Econ. Geography	3
Engl. 1	English Comp	3	Engl. 2	English Comp	3
Math. 1b	Gen. Math	3	Math. 40	Math. of Finance.	3
	Science	3		Science	3
	For. Lang. or Arts Option	3		For. Lang. or Arts Option	3
Mil. 1	Mil. Science	2	Mil. 2	Mil. Science	2
P.E. 1	Physical Ed	—	P.E. 2	Physical Ed	—
M.R.P. 10	Student Phil	—			

FIRST SEMESTER	SOPHOMORE YEAR		SECOND SEMESTER		
Acctg. 1	Accounting	3	Acctg. 2	Accounting	3
Eco. 3	Economics	3	Eco. 4	Economics	3
	Engl. or For. Lang. or Arts Option	9		Engl. or For. Lang. or Arts Option	9
Mil. 3	Mil. Science	2	Mil. 4	Mil. Science	2
P.E. 3	Physical Ed.	—	P.E. 4	Physical Ed.	—

FIRST SEMESTER	JUNIOR YEAR		SECOND SEMESTER		
E.S. 145	Statistical Method	3	E.S. 146	Bus. Cycles	3
Fin. 21	Corp. Finance	3	Fin. 22	Corp. Fin.	3
Eco. 11	Marketing	3	Eco. 33	Money & Banking.	3
	Adv. Bus. Ad. Options or Free Elective	6		Adv. Bus. Ad. Options or Free Elective	6
P.E. 5	Physical Ed.	—	P.E. 6	Physical Ed.	—

FIRST SEMESTER	SENIOR YEAR		SECOND SEMESTER		
	Adv. Bus. Ad. Options or Free Elective	15		Adv. Bus. Ad. Options or Free Elective	15
P.E. 7	Physical Ed.	—	P.E. 8	Physical Ed.	—

The College of Engineering

THE COLLEGE OF ENGINEERING

Administrative Officers

Clement Clarence Williams, *President of the University*

Alfred Copeland Callen, *Dean of the College of Engineering*

Wray Hollowell Congdon, *Dean of Undergraduates*

George Bartlett Curtis, *Registrar*

Earl Kenneth Smiley, *Director of Admissions*

Faculty

Edward Delbert Amstutz....*Chemistry and Chemical Engineering*
Harold Victor Anderson.....*Chemistry and Chemical Engineering*
Lee Terrell Askren.....*Mechanical Engineering*
Paul Leverne Bayley.....*Physics*
Jacob Lynford Beaver.....*Electrical Engineering*
George Carlton Beck.....*Chemistry and Chemical Engineering*
Sylvanus A. Becker.....*Civil Engineering*
Peter Gabriel Bergmann.....*Physics*
Charles Clarence Bidwell.....*Physics*
Robert Dominick Billinger..*Chemistry and Chemical Engineering*
Cornelius Godfrey Brennecke.....*Electrical Engineering*
Robert August Buerschaper.....*Physics*
Allison Butts.....*Metallurgical Engineering*
Alfred Copeland Callen.....*Mining Engineering*
Preston Banks Carwile.....*Physics*
Elliott Ward Cheney.....*Physics*
Alpha Albert Diefenderfer..*Chemistry and Chemical Engineering*
Gilbert Everett Doan.....*Metallurgical Engineering*
William Joseph Eney.....*Civil Engineering*
James Van Deusen Eppes.....*Mechanical Engineering*
Warren Walter Ewing.....*Chemistry and Chemical Engineering*

Frederic Philip Fischer.....*Electrical Engineering*
Frank Junior Fornoff.....*Chemistry and Chemical Engineering*
Walton Forstall, Jr.....*Mechanical Engineering*
John H. Frye, Jr.....*Metallurgical Engineering*
Merton Otis Fuller.....*Civil Engineering*
Robert Taylor Gallagher.....*Mining Engineering*
Howard Dietrich Gruber.....*Electrical Engineering*
Thomas Huger Hazlehurst..*Chemistry and Chemical Engineering*
Willis Amos Heisey.....*Chemistry*
Paul Hessemer.....*Civil Engineering*
Arthur Thomas Ippen.....*Civil Engineering*
Thomas Edgar Jackson.....*Mechanical and Industrial Engineering*
Arthur Warner Klein.....*Mechanical and Industrial Engineering*
Robert Hervey Lafferty, Jr.....*Chemistry*
Fred Viall Larkin.....*Mechanical and Industrial Engineering*
Francis S. McGuiness.....*Mechanical Engineering*
Archie Roscoe Miller.....*Electrical Engineering*
Elias Robins Morgan.....*Mechanical Engineering*
Douglas Ewart Mode.....*Electrical Engineering*
Harvey Alexander Neville....*Chemistry and Chemical Engineering*
Harry Gordon Payrow.....*Civil Engineering*
Max Petersen.....*Physics*
Earl James Serfass.....*Chemistry and Chemical Engineering*
Charles Wellington Simmons
Chemistry and Chemical Engineering
Judson Gray Smull.....*Chemistry and Chemical Engineering*
Charles Emmet Stoops.....*Chemical Engineering*
Robert Daniel Stout.....*Metallurgical Engineering*
Milton Caleb Stuart.....*Mechanical and Industrial Engineering*
Hale Sutherland.....*Civil Engineering*
Edwin Raymond Theis.....*Chemistry and Chemical Engineering*
Eugene Henry Uhler.....*Civil Engineering*
Richard Kreidler Walton.....*Chemistry*
Albert Charles Zettlemoyer.....*Chemistry*

THE COLLEGE OF ENGINEERING

The College of Engineering offers curricula in

Chemical Engineering
Chemistry
Civil Engineering
Electrical Engineering
Engineering Physics
Industrial Engineering
Mechanical Engineering
Metallurgical Engineering
Mining Engineering
Combined Engineering and Arts

The Curricula

The engineering curricula were formulated on the basis of an intensive study, by the faculty of Lehigh University, of the problems of technical education and the changing needs of modern industry. This study led to the conclusion that greater emphasis than heretofore should be placed upon the fundamentals of engineering, including mathematics, physics, chemistry, and theoretical and applied mechanics, and less emphasis upon the highly specialized details of engineering practice; and that the engineer must know something of the social sciences, that is, the sciences which deal with human relations, and be familiar with the methods of business organization and administration. The various engineering curricula accordingly emphasize the fundamental sciences and those humanistic subjects which are a part of the equipment of every well educated man and which are now recognized as essential to the proper training of engineers because of their practical applications in industrial, business, and civic life.

Advanced courses in military science and tactics are optional with other courses subject to the approval of the director of the curriculum concerned.

Among the noteworthy features of the curricula the following may be mentioned:

(1) Provision is made for a uniform freshman year in the College of Engineering, and the students' definite choices among

the specialized engineering curricula are deferred until the spring of the freshman year, when it is hoped they may be prepared, after a year of college work, and on the basis of guidance in engineering conferences, to choose wisely; students who at registration in the fall already have preferences for one curriculum or another are asked to indicate such preferences, but the indications noted at that time are regarded as merely tentative and do not commit the students in any way.

(2) The work of the first two years is fairly self-contained. To those who for one reason or another are unable to complete their engineering training, it affords preparation for careers as draftsmen, electricians, surveyors, shop foremen, or assistants in industrial laboratories or plants. Students who complete in full the work of the first two years and who then withdraw from the University are given a certificate of work completed.

(3) Near the close of the second year every sophomore is required to take a general engineering aptitude test to determine his ability to apply to engineering problems the principles of chemistry, mathematics, and physics studied during his first two years. Students whose showing in this examination is unsatisfactory and whose work for the first two years has been poor may be compelled to withdraw from the College of Engineering and to change into other curricula better suited to their aptitudes and interests.

(4) Since the University recognizes that an engineer cannot be trained purely academic process, the degree awarded upon graduation is Bachelor of Science in the particular division of engineering that has been studied, for example, B.S. in Civil Engineering. The successful completion of one year of graduate study leads to the degree of Master of Science in the particular division of engineering studied. Professional degrees are conferred after five years of acceptable experience, as noted below.

Engineering Conferences

During the sophomore year engineering conferences are conducted in the curriculum of the student's choice. By means of these conferences and by the appraisal made by each curriculum director throughout the sophomore year an estimate of the student's aptitude for further engineering work is attempted.

The Uniform Freshman Year

An outline follows of the work of the freshman year, uniform for all engineering students. For schedules of the work of the upper three years, varying according to the several specialized curricula see the subsequent pages.

FRESHMAN YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Chem. 1 or 3.	Chemistry	2	Chem. 8	Stoichiometry	1
Chem. 11or13.	Chemistry Lab.	2	Chem. 20	Qual. Analysis	3
C.E. 1	Engr. Drawing	2	C.E. 2	Engr. Drawing	2
Engl. 1	English	3	Engl. 2	English	3
Math. 11	Alg. & Anal. Geom.	3	Math. 12	Anal. Geom. & Cal.	3
Phys. 22 or Math. 20	Mech. & Light or Mechanics	4	Math. 20 or Phys. 22	Mechanics or Mech. & Lt.	4
Mil. 1	Military Science	2	Mil. 2	Military Science	2
P.E. 1	Physical Education	—	P.E. 2	Physical Education	—
M.R.Phil. 10.	Student Philosophy	—			
		18			18

Selection of Specialized Curricula

In the second semester of his freshman year each engineering student must announce his selection of the particular engineering curriculum which he desires to continue. This announcement must be made at least one month before the end of the semester named.

Inspection Trips

Inspection trips to industrial plants are a required part of specific courses in the various curricula in engineering. Written reports or examinations are required. These trips are under the general direction and supervision of the faculty committee on inspection trips. They are generally held during the senior year and involve an average expense of about $25.00. The location of the University in the center of industrial activities of various kinds furnishes unusual opportunities for visits of inspection to engineering plants.

Combined Arts and Engineering Curricula

Students who can afford the extra time and money are urged to spend five years in their collegiate training and to cover the requirements for the degrees of B.A. and B.S. in engineering. Under the five-year plan a student registers in the College of Arts and Science for four years, earning the B.A. degree on

completion of a program which includes, along with specific B.A. training, the fundamental mathematical, scientific, and engineering subjects of the engineering curriculum of his choice. The fifth year is spent in the College of Engineering, carrying on a program leading to the degree of B.S. in his selected branch of engineering. This is usually the senior year curriculum of the chosen branch of engineering.

An engineering student, who decides at any stage of his course that he wishes to work for both the B.A. and B.S. degrees, may register in one of the colleges concerned for a period of years and complete the combined requirements of both degrees in five or six years, depending upon the program followed before the decision is made. His curriculum is so arranged that the work for one degree may be finished at the end of a four-year period, and the work for the subsequent degree at the close of the fifth or sixth year.

Graduates of liberal arts colleges planning to become candidates for a baccalaureate degree in engineering are referred to page 29.

Professional Engineering Degrees

Graduates of the various technical curricula of Lehigh University with the degree of Bachelor of Science in Civil Engineering, Mechanical Engineering, Electrical Engineering, Metallurgical Engineering, Mining Engineering, Chemical Engineering, and Industrial Engineering, may be candidates for the corresponding professional degrees, namely, Civil Engineer (C.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E.), Metallurgical Engineer (Met.E., Mining Engineer (E.M.), Chemical Engineering (Ch.E.), and Industrial Engineer (I.E.). To qualify for a professional degree, a candidate must submit evidence of having had, since graduation, at least five years of acceptable experience in the field of engineering corresponding to the degree desired, and must submit also an acceptable thesis, the subject of which must be approved in advance by the department concerned. In those cases where the degrees applied for does not correspond in subject to the candidate's undergraduate training, evidence must be furnished that any such scholastic deficiency has been satisfied.

Graduates of Lehigh University with the degree of Master of Science in one of the engineering fields may be candidates for

the appropriate professional degrees on the same basis as holders of a baccalaureate degree. A candidate who has had a year of acceptable graduate work at Lehigh or elsewhere may count the graduate year toward the partial satisfaction of the requirement of five years of acceptable experience.

Declaration of candidacy for professional degrees must be made on or before January 1 of the year in which the candidate expects to receive his degree. Application blanks may be obtained from the registrar. The thesis must be submitted in duplicate (one copy for the department and one for the University Library) on or before March 15 and should be sent directly to the department concerned. Formal application for a professional degree, accompanied by the graduation fee of $10, must be made before May 15 of the year in which the degree is to be conferred. Professional degrees are conferred only in June.

THE CURRICULUM IN CHEMICAL ENGINEERING

The curriculum in chemical engineering is designed to prepare the student for the profession of chemical engineer, which includes the design, construction, operation, and management of manufacturing establishments in which chemical products are made. Such substances include paper, gasoline and other petroleum products, cement, coke, gas, dyes, electrochemical products, paints, rubber, leather, foods, and other substances. In addition to the primary requirement of chemistry in all its branches, the training of the chemical engineer includes a thorough knowledge of physics and mathematics, and a sound understanding of such fundamentals of chemical, mechanical, and electrical engineering as will make him a discriminating research, operating, or sales engineer.

After chemical investigations furnish a better understanding of known process or develop novel processes or novel methods, it is the particular province of chemical engineering to carry them forward into industrial production. The curriculum is not planned to turn out a specialist restricted to any one type of product; the aim is rather to develop expertness in the sciences and fundamental unit manufacturing processes which underlie all chemical engineering. Some familiarity with factory methods under actual working conditions is acquired through contact with operations in nearby plants. Frequent visits for observation and report are made to manufacturing plants in the immediate neighborhood and in the Philadelphia and New York districts.

Approved elective sequences through the junior and senior years are provided as variants of the regular curriculum. These are:

BUSINESS ADMINISTRATION

Fin. 25 .....Corporation Finance	Acctg. 4 ....Accounting
E.S. 145 ....Statistical Method	E.S. 146 ....Bus. Cycles & Fore.

MATHEMATICS-PHYSICS

Math. 106 ...Advanced Calculus	Math. 124 ...Theory of Errors
Math. 111 ...Differential Equations	Math. 112 ...Differential Equations
or Phys. 160.Mod. Phys. Theories	or Phy. 161.Mod. Phys. Theories

BIOCHEMISTRY

Biol. 52 ....Bacteriology	Biol. 153 ...Advanced Bacteriology
Biol. 1 .....Biology	Chem. 171 ..Indus. Biochemistry

EDUCATION

Educ. 1 .....Intro. to Teaching	Psych. 1 ....Psychology
Educ. 51 ....Prin. of H.S. Teaching	Educ. 20 ....Educ. Psychology

THE CURRICULUM IN CHEMICAL ENGINEERING

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Chem. 30	Quant. Analysis	3	Chem. 31	Quant. Analysis	3
Chem. 41	Quant. Anal. Conf.	1	Chem. 45	Quant. Anal. Conf.	1
Eco. 3	Economics	3	Eco. 4	Economics	3
*Ger. 1 or 3	German	3	Ger. 2 or 4	German	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3
Phys. 24	Elec. & Magnetism	4	Phys. 23	Dynamics & Heat.	4
Mil. 3	Military Science	2	Mil. 4	Military Science	2
E.C. 3	Engr. Conferences.	—	E.C. 4	Engr. Conferences.	—
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—
		19			19

* Students in this curriculum are required to pass Ger. 7 (3). Those who are able to omit one or both semesters of the courses prerequisite to Ger. 7 will elect other courses as substitutes.

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Chem. 6	Inorg. Chemistry	3	Chem. 7	Physical Chem.	3
Ch.E. 78	Chemical Engr.	3	Ch.E. 79	Chemical Engr.	3
Chem. 150	Organic Chemistry.	3	Chem. 151	Organic Chemistry.	3
Chem. 165	Org. Chem. Lab.	2	Chem. 167	Org. Chem. Lab.	2
Ger. 7	German	3	Chem. 179	Hist. & Lit. Chem.	1
	Elective	3	M.E. 29	Heat Engines	3
P.E. 5	Physical Education	—		Elective	3
		17	P.E. 6	Physical Education	—
					18

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Chem. 158 / Chem. 171 / Ch.E. 183	Adv. Org. Chem. or Ind.Biochem. or Unit Processes	3	Chem. 99	Research Lab.	2
Ch.E. 180	Chem. Engr.	3	Ch.E. 181	Chemical Engr.	3
Chem. 190	Physical Chem.	3	Ch.E. 185	Chem. Engr. Prac.	1
Chem. 193	Phys. Chem. Lab.	2	Chem. 194	Phys. & E'trochm.	3
E.E. 58	Electrical Mach.	3	Chem. 197	Electrochem. Lab.	1
M.E. 19	Engineering Lab.	1	C.E. 9	Mech. of Materials	3
	Elective	3	E.E. 59	Dynamo Lab.	1
P.E. 7	Physical Education	—		Elective	3
		18	P.E. 8	Physical Education	—
					17

THE CURRICULUM IN CHEMISTRY

The chemist needs a deep insight into the phenomena of matter and into the many processes in which matter undergoes change. The graduate in chemistry may use his education to discover and investigate hitherto unknown combinations of matter and of energy, or he may apply known facts and principles to new and useful purposes in manufacture or in the arts. In preparation for a professional career, the training is thorough in fundamentals and leads to a comprehensive understanding of the scientific and industrial achievements of chemistry.

The curriculum offers an education primarily in chemistry, with considerable training in related sciences and with an adequate grounding in chemical engineering principles. The modern conception of an education in chemistry includes a coordinate study of physics and mathematics. In addition to these so-called physical sciences, other studies, planned to aid and develop the thought-processes and culture of the student, are embodied in the curriculum. It is believed by many practicing chemists and industrial chemists that an undergraduate course such as this one which includes a liberal allotment of study in the humanities is the best preparation for a successful career both in pure science and in the business application of chemistry.

Approved elective sequences adapted to particular objectives are provided as described under chemical engineering above. Other approved sequences may be arranged.

Without reducing the professional training in chemistry, physics, and mathematics, the curriculum can be adapted to include the educational training required for state certification toward teaching these sciences in public high schools.

Since the freshman and sophomore years of this curriculum and of the curriculum in chemical engineering are the same, it is possible for a student to change from one curriculum to the other at the end of either semester of the sophomore year.

Seniors in the curriculum in chemistry may arrange to make the supervised visits to industrial plants required in the curriculum in chemical engineering.

THE CURRICULUM IN CHEMISTRY

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Chem. 30	Quant. Analysis	3	Chem. 31	Quant. Analysis	3
Chem. 41	Quant. Anal. Conf.	1	Chem. 45	Quant. Anal. Conf.	1
Eco. 3	Economics	3	Eco. 4	Economics	3
*Ger. 1 or 3	German	3	*Ger. 2 or 4.	German	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3
Phys. 24	Elec. & Magnetism	4	Phys. 23	Dynamics & Heat.	4
Mil. 3	Military Science	2	Mil. 4	Military Science	2
E.C. 3	Engr. Conferences.	—	E.C. 4	Engr. Conferences.	—
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—
		19			19

* Students in this curriculum are required to pass Ger. 7 (3). Those who are able to omit one or both semesters of the courses prerequisite to Ger. 7 will elect other courses as substitutes.

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Chem. 6	Inorg. Chemistry	3	Chem. 7	Physical Chem.	3
Chem. 150	Organic Chemistry.	3	Ch.E. 80	Ind. & Eng. Chem.	3
Chem. 165	Org. Chem. Lab.	2	Chem. 151	Organic Chemistry.	3
	English	3	Chem. 166	Org. Chem. Lab.	3
Ger. 7	German	3	Chem. 179	Hist. & Lit. Chem.	1
	Elective	3		English	3
P.E. 5	Physical Education	—		Elective	3
		17	P.E. 6	Physical Education	—
					19

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Chem. 158	Adv. Org. Chem. or Ind.Biochem.	3	Chem. 97	Research Lab.	3
Chem. 171			Chem. 137	Adv. Anal. Chem.	3
Chem. 190	Physical Chem.	3	Chem. 159	Adv. Org. Chem.	3
Chem. 193	Phys. Chem. Lab.	2	Chem. 194	Phys. & E'trochem.	3
	Electives	9	Chem. 197	Electrochem. Lab.	1
P.E. 7	Physical Education	—		Elective	3
		17	P.E. 8	Physical Education	—
					16

THE CURRICULUM IN CIVIL ENGINEERING

The purpose of this curriculum is to give instruction in those general and scientific subjects which form the foundation of all engineering, and a special training in the field of civil engineering, which includes the building of highways, railroads, harbors, docks and terminals, bridges, buildings, subways, tunnels, water supply and purification plants, sewage systems and sewage disposal plants, water power developments and surveys. To enable the civil engineering graduate to deal with allied technical problems arising in most civil engineering projects of today, the curriculum includes certain special studies in the fields of mechanical and electrical engineering, geology, and metallurgy. Courses in economics, accounting, and finance have been added since it is essential that the graduate have a knowledge of the fundamentals of business. In preparation for civic responsibility, each student in the senior year studies the basic concepts of our American democracy and of the political philosophies which challenge democracy. In the senior year also there is opportunity for the consideration of these and other topics in the field of the humanities through the medium of elective courses.

The work of the first three years deals chiefly with the scientific and mathematical basis of engineering practice. In the fourth year the application of these basic principles is studied in structural, hydraulic, sanitary, and transportation engineering, the major divisions of the wide field of civil engineering. Sanitary engineering is highly specialized and the student who wishes to practice in this field should elect the sanitary option, which, in addition to the basic material covered in the general option, gives consideration also to those fundamentals of chemistry and bacteriology requisite to knowledge of water purification and of sewage and waste disposal. A program of studies, planned to suit individual needs, known as the administrative option, is available for those students who wish to prepare themselves for the superintendence of construction, the administration of public works, dealing in building material, general contracting, and other work requiring operational organization and economy of management.

The positions open to new graduates include those of inspector, timekeeper, and engineering assistant on construction work, instrument man on surveys, draftsman, computer, and engineering apprentice.

THE CURRICULUM IN CIVIL ENGINEERING

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
C.E. 6a	Land and Top. Sur.	3	C.E. 31a	Route Surveying	3
Eco. 3	Economics	3	Eco. 4	Economics	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3
Phys. 23	Dyn. & Heat	4	Phys. 24	Elec. & Magnetism	4
Mil. 3	Military Science	2	Mil. 4	Military Science	2
General Option			General Option		
Geol. 10	Prin. of Geology.	3	Geol. 9	Engr. Geology	3
or Sanitary Option		or	or Sanitary Option		or
Chem. 30	Quant. Analysis	4	Biol. 50	San. Bact.	3
Chem. 41	Quant. An. Conf.		E.C. 4	Engr. Conferences.	—
E.C. 3	Engr. Conferences.	—	P.E. 4	Physical Education	—
P.E. 3	Physical Education	—			
		18 or 19			18

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
C.E. 8	Mech. of Materials	4	*Acctg. 4	Accounting	3
C.E. 10	Mat. Testing Lab.	1	C.E. 12	Hydraulics	3
*Fin. 25	Corp. Finance	3	C.E. 14	Hydraulics Lab.	1
M.E. 29	Heat Engines	3	C.E. 19	Adv. Mech. of Mat.	3
General Option			Met. 21	Engr. Met.	2
C.E. 16	Highway Engr.	3	General Option		
E.E. 50	Dyn. & Motors.	2	C.E. 15	Stresses	4
E.E. 51	Dynamo Lab.	1	E.E. 52	Alt. Currents	2
or Sanitary Option		or	E.E. 53	Dynamo Lab.	1
Chem. 150	Organic Chem.	3	or Sanitary Option		or
E.E. 58	Electrical March.	3	C.E. 15a	Stresses	2
E.E. 59	Dyn. Lab. Comb.	1	Chem. 151	Organic Chem.	3
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—
		17 or 18			19 or 18

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
C.E. 118	Structural Theory.	3	C.E. 101	Foundations	2
C.E. 125	Reinf. Conc. Design	3	C.E. 126	Concrete Lab.	1
C.E. 128	Sanitary Engr.	3	C.E. 129	San. Eng. Des.	3
General Option			General Option		
C.E. 35	Adv. Surveying.	3	C.E. 11	Railroad Eng.	3
C.E. 119	Struc. Design	3	C.E. 120	Struc. Design	2
*Govt. 163	Cont. Pol. Tho't.	3	C.E. 41a	C.E. Proseminar.	1
or Sanitary Option			C.E. Elective (C.E. 100 or 124		
C.E. 119a	Struc. Design	1	or 131 or 132		
C.E. 16a	Highway Engr.	2	or 50)		3
Geol. 10	Princ. of Geol.	3	*Govt. 164	Cont. Pol. Tho't.	3
*Govt. 157	Municipal Govt.	3	or Sanitary Option		
P.E. 7	Physical Education	—	C.E. 120a	Struc. Design	1
			C.E. 41a	C.E. Proseminar.	1
			C.E. 131	Adv. San. Engr.	3
			Geol. 9	Engr. Geology	3
			*Govt. 158	Municipal Adm.	3
			C.E. 40	Engr. Conference	—
			P.E. 8	Physical Education	—
		18			18 or 17

ADMINISTRATIVE OPTION: In the sophomore, junior, and senior years there is opportunity for a program of twelve credit hours in subjects pertaining to business, industrial management, and social organization, obtained by substitution of an approved program for certain of the work in the general option.

* By permission of the director of the curriculum, a non-technical elective may be taken in place of this course.

THE CURRICULUM IN ELECTRICAL ENGINEERING

The electrical engineer is one who practices the science and art of economically "directing the sources of electrical power in nature for the uses and conveniences of man." He may design, manufacture, install, or operate electrical machinery and equipment, manage plants and electric systems, or engage in the promotion of engineering projects.

The object of this curriculum is to give instruction in those general and scientific subjects which underlies all the branches of engineering, and to give special training in those technical and business subjects which experience shows are most essential in the equipment of the electrical engineer. In seeking to accomplish this object the department puts chief emphasis upon mastery of the mathematical-physical principles and thoroughness in the analysis of problems.

The curriculum provides a balanced allotment of time in each of four principal divisions: (1) mathematics and the basic sciences, (2) electrical engineering, (3) allied branches of engineering, and (4) non-technical subjects in arts and business. In order to make maximum use of the available time, the electrical courses are highly coordinated with respect to classroom and laboratory work; concurrent courses are designed to augment and supplement each other; and consecutive courses to extend and build upon the previous courses.

In recognition of different talents and inclinations among individuals, and of specialization in industry, three separate options are offered in the Senior year: (1) the "Power Option" for those interested in the technical aspects of design, operation, and development of electrical machinery and power systems; (2) the "Communication Option" for those interested in the technical aspects of wire or radio communications; and, (3) the "General Option" for those less interested in technical applications and more inclined towards commercial, managerial and executive assignments. The work of the first three years and some of that in the senior year is identical for each option; so that all graduates will have had the same basic work. Thus, although a student elects a particular option, he has a foundation sufficiently fundamental to enable him to enter any branch of electrical engineering.

THE CURRICULUM IN ELECTRICAL ENGINEERING

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Met. 21	Metallurgy	2	E.E. 32	Direct Cur. Mach.	4
Met. 81	Met. Problems	1	E.E. 33	D. C. Lab.	2
Phys. 24	Elec. & Magnetism	4	Phys. 23	Dynamics & Heat.	4
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3
Eco. 3	Economics	3	Eco. 4	Economics	3
Mil. 3	Military Science	2	Mil. 4	Military Science	2
Speech 30	Fund. of Speech	3	E.C. 4	Engr. Conferences.	—
E.C. 3	Engr. Conferences.	—	P.E. 4	Physical Education	—
P.E. 3	Physical Education	—			
		18			18

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
E.E. 34	A.C. Circuits	3	E.E. 36	A.C. Machines	3
E.E. 35	A.C. Circuits Lab.	1	E.E. 37	A.C. Mach. Lab.	2
Math. 106	Adv. Calculus	3	E.E. 40	Electronics	3
C.E. 9	Mech. of Materials	3	C.E. 13	Hydraulics	2
C.E. 10	Mat. Testing Lab.	1	C.E. 14	Hydraulics Lab.	1
M.E. 22	Heat Engines	3	M.E. 23	Heat Engines	3
Phys. 110	Adv. Elec. Lab.	1	Phys. 111	Adv. Elec. Lab.	1
	*General Study	3		*General Study	3
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—
		18			18

* See Register, bottom of page 97.

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
M.E. 21	Engineering Lab.	1	M.E. 25	Engineering Lab.	1
E.E. 38	A.C. Machines	3	E.E. 118	Proseminar	1
E.E. 39	A.C. Machine Lab.	2		Arts or Bus. Elec.	3
E.E. 117	Proseminar	1			

POWER OPTION

E.E. 131	Elec. & Mag. Fields	3	E.E. 132	Electric Transients	3
E.E. 133	Transmission Lines	3	E.E. 134	Trans. Line Trans.	3
E.E. 135	Symmetrical Comp.	3	E.E. 136	System Stability	2
Math. 121	Analytic Mech.	3	E.E. 137	Adv. Mach. Theory	3
			E.E. 138	Transients Lab.	1

COMMUNICATION OPTION

E.E. 131	Elec. & Mag. Fields	3	E.E. 132	Electric Transients	3
E.E. 141	Radio Commun.	3	E.E. 142	Radio Commun.	2
E.E. 143	Wire Commun.	3	E.E. 144	Wire Commun.	3
Math. 121	Analytic Mech.	3	E.E. 146	Ultra High Freq.	4

GENERAL OPTION

E.E. 101	Electric Power Sta.	3	E.E. 102	Distr. Systems	3
E.E. 103	Industrial App.	3	E.E. 106	Illumination Engr.	3
I.E. 2	Ind. Management	3	I.E. 3	Ind. Management	3
	Business Elective	3	Acctg. 4	Accounting	3
		19			17

THE CURRICULUM IN ENGINEERING PHYSICS

The curriculum in engineering physics has been developed over a number of years to meet a demand on the part of industry and government for men trained in the fundamentals and technique of scientific research.

Industrial expansion, development and even the establishment of entirely new industries have repeatedly followed upon research. The widespread recognition of this fact in recent years has led to the organization of laboratories of research in nearly every industry great and small, with a consequent demand for suitably trained men.

The amazing expansion in the electrical industries is almost wholly the result of organized research. This statement applies more or less to every major industry. The products of research include the incandescent lamp, the x-ray tube, telephone, radio, automobile, airplane, talking movies, optical glass, etc.

While the training in this curriculum is intended to be in fundamentals primarily, it is still consciously practical. While it is practical it is not permitted to lose sight of the fact that today's theory may yield tomorrow's practice.

Graduates from this curriculum find places in government laboratories and in the laboratories of the electrical, communication, automotive, and other industries. Some students continue their studies in the academic field, pursuing research as members of the staff of a college or university.

The curriculum includes a liberal number of electives, wherein each student may develop his best talents by particular attention to topics of special interest. Such topics constitute a liasion with particular branches of technology, among which may be mentioned electro-acoustics, telephone engineering, geophysical practice, etc. Each student is urged to cultivate some such special interest but only to that moderate degree which still permits him to lay a thoroughly adequate basis of fundamentals.

THE CURRICULUM IN ENGINEERING PHYSICS

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Eco. 3	Economics	3	Eco. 4	Economics	3
Ger. 1 or 3	German	3	Ger. 2 or 4	German	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3
Phys. 23	Dynamics & Heat	4	Phys. 24	Elec. & Magnetism	4
Chem. 6	Inorg. Chemistry or Mineralogy	3	Chem. 7	In. & Phys. Chem. or Geology	3
Geol. 1			Geol. 10		
Mil. 3	Military Science	2	Mil. 4	Military Science	2
E.C. 3	Engr. Conferences.	—	E.C. 4	Engr. Conferences.	—
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—
		18			18

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Math. 106	Adv. Calculus	3	Math. 121	Anal. Mechanics	3
Phys. 110	Adv. Elec. Lab.	1	Phys. 111	Adv. Elec. Lab.	1
Phys. 122	Physical Optics	3	Phys. 126	Pyrometry	3
Phys. 162	Th. Elec. & Mag.	3	Phys. 163	Th. Elec. & Mag.	3
E.E. 50	Dyn. & Motors. 2		E.E. 52	Alt. Currents 2	
E.E. 51	& Dyn. Lab. 1	3	E.E. 53	& Dyn. Lab. 1	3
M.E. 22	or Heat Eng.		M.E. 23	or Heat Eng.	
Ger. 3	German	3	Ger. 4	German	3
Fr. 1	or French		Fr. 2	or French	
	Elective	3		Elective	3
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—
		19			19

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Phys. 124	El. Dis. in Gases.	3	Phys. 120	Electric Waves	3
Phys. 160	Mod. Theories	3	Phys. 161	Mod. Theories	3
Phys. 164	Advanced Lab.	2	Phys. 165	Advanced Lab.	2
C.E. 9	Mech. of Mat.		Chem. 194	Phys. Chem. 3	
Chem. 190	or Ph. Chem. 3		Chem. 197	& Electrochem. Lab. 1	
Chem. 193	& Lab. 2				
Geol. 111	or Field Geol. 2	3	E.E. 132	or El. Trans. 3	3
Geol. 114	& Str. Geol. 3		Geol. 110	or Stratig'y 2	
Math. 111	or Adv. Dif. Eq. 3		Math. 112	or Adv. Dif. Eq. 3	
Met. 21	or Engr. Met. 2		Math. 124	or Theo. of Er. 3	
Met. 81	& Met. Prob. 1		Met. 21	or Engr. Met. 2	
	Electives	6	Met. 81	& Met. Prob. 1	
P.E. 7	Physical Education	—		Electives	6
			P.E. 8	Physical Education	—
		17			17

THE CURRICULUM IN INDUSTRIAL ENGINEERING

Industrial engineering has to do with the organization, operation, and management of manufacturing plants, public utilities, and operating, holding, and management companies. Broadly considered, it covers the engineering aspects of plant location, plant layout, routing, production control, maintenance, stores, and inspection; the economic aspects of employment, employee training, promotion, wage payment, bonus, safety and welfare, insurance, and old age pensions; and the commercial aspects of purchasing, marketing, credit, accounting, and finance.

Industrial enterprises depend on sound financing, adequate accounting, and intelligent forecasting of economic developments. Technical skill and engineering efficiency are primary requisites, but these alone are not sufficient. There is a demand by industry for men who have had not only a thorough training in the fundamentals of engineering, but also a knowledge of the problems of accounting, finance, statistics, and management which every enterprise encounters. The object of the curriculum in industrial engineering is to add a knowledge of the basic facts of economics, finance, and management to the technical knowledge and scientific spirit that come from the study of engineering.

The curriculum in industrial engineering is primarily an engineering curriculum supplemented by courses in economics and business administration, so chosen as to provide a thorough training in the fundamental principles of economics, industrial management, corporation financing, and business practice. The curriculum is designed primarily to meet the needs of that considerable body of students who intend to enter industries essentially technical, whether public utilities or manufacturing plants, but who intend to go into the administrative departments.

THE CURRICULUM IN INDUSTRIAL ENGINEERING

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Eco. 3	Economics	3	Eco. 4	Economics	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3
M.E. 1	Elem. Mch. Design	3	M.E. 4	Elem. Mch. Design	3
M.E. 2	El. Heat Engines.	3	M.E. 5	Heat Engines	3
Phys. 23	Dynamics & Heat.	4	Phys. 24	Elec. & Magnetism	4
Mil. 3	Military Science	2	Mil. 4	Military Science	2
E.C. 3	Engr. Conferences.	—	E.C. 4	Engr. Conferences.	—
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—
		18			18

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Acctg. 4	Accounting	3	C.E. 32	Mech. of Materials	3
Fin. 25	Corp. Finance	3	E.E. 52	Alt. Currents	2
E.E. 50	Dyn. & Motors.	2	E.E. 53	Dynamo Lab.	1
E.E. 51	Dynamo Lab.	1	I.E. 13	Industrial Engr.	3
Met. 21	Metallurgy	2	M.E. 19	Engr. Lab.	1
Met. 81	Met. Problems	1	M.E. 33	Thermodynamics	2
Psych. 1	Psychology	3	Psych. 15	Industrial Psych.	3
	Arts Elective	3		Arts Elective	3
P.E. 5	Physical Education	—	P.E. 6	Physical Education	—
		18			18

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
E.S. 145	Stat. Method	3	E.S. 146	Business Cycles	3
Acctg. 115	Cost Accounting	3	Law 102	Business Law	3
I.E. 111	Industrial Adm.	3	Min. 15	Mining Engr.	3
M.E. 40	Machine Design	3	I.E. 112	Personnel Adm.	3
	Business Elective	3		Business Elective	3
	Elective	3		Elective	3
P.E. 7	Physical Education	—	P.E. 8	Physical Education	—
		18			18

THE CURRICULUM IN MECHANICAL ENGINEERING

Mechanical engineering deals with the design, construction, installation, and operation of machinery necessary for the economical and advantageous use of power, and with the management of industries and organizations manufacturing and using power-driven equipment. The high degree of technical skill and efficiency essential to the work of research, design, construction, and operation, which underlies mechanical engineering practice, necessarily prescribes a training based on the fundamental sciences of chemistry, physics, and mathematics.

Aptitude and skill in the interpretation and application of the basic technical sciences are, however, not sufficient. In addition the engineer must acquire an understanding of the influences of his profession on social institutions and traditions. To this end the curriculum requires the student to register for courses in the College of Arts and Science or the College of Business Administration or both, during each of the four years. Specialization in particular fields of mechanical engineering is not undertaken. Class room courses are supplemented with laboratory exercises which are designed to give the student a maximum of freedom in demonstration.

The curriculum is broad, highly technical, and designed to meet the needs of young men interested in the scientific aspects of industry. Emphasis is placed on the fundamental principles underlying the numerous fields of mechanical engineering, including aerodynamics, aeronautics, air conditioning, automotive engineering, and Diesel engines. The young graduate ordinarily enters a graduate apprenticeship in a public utility, manufacturing, or operating organization where opportunity is provided for his development in research, design, operation, sales, or administration, depending upon his interests and aptitudes and the opportunities available.

THE CURRICULUM IN MECHANICAL ENGINEERING

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Eco. 3	Economics	3	Eco. 4	Economics	3
Math. 13	Calculus	3	Math. 14	Inter. Calculus	3
M.E. 1	Elem. Mch. Design	3	M.E. 4	Elem. Mch. Design	3
M.E. 2	El. Heat Engines.	3	M.E. 5	Heat Engines	3
Phys. 23	Dynamics & Heat.	4	Phys. 24	Elec. & Magnetism	4
Mil. 3	Military Science	2	Mil. 4	Military Science	2
E.C. 3	Engr. Conferences.	—	E.C. 4	Engr. Conferences.	—
P.E. 3	Physical Education	—	P.E. 4	Physical Education	—
		18			18

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
C.E. 32	Mech. of Materials	3	E.E. 50	Dyn. & Motors	2
Fin. 25	Corp. Finance	3	E.E. 51	Dynamo Lab.	1
I.E. 13	Industrial Engr.	3	Math. 121 or Math. 126	Anal. Mechanics / Adv. Math	3
Math. 106 or Math. 125	Adv. Calculus / or Adv. Math	3	M.E. 11	Engineering Lab.	1
M.E. 9	Engineering Lab.	1	M.E. 35	Int. Comb. Engines	2
M.E. 33	Thermodynamics	2	M.E. 40	Machine Design	3
	Arts Elective	3	Met. 21	Metallurgy	2
P.E. 5	Physical Education	—	Met. 81	Met. Problems	1
				Arts Elective	3
			P.E. 6	Physical Education	—
		18			18

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
C.E. 33	Hydraulics	3	Acctg. 4	Accounting	3
E.E. 52	Alt. Currents	2		Engr. Elective	3
E.E. 53	Dynamo Lab.	1	M.E.†	Adv. Mech. Engr.	3
M.E. 114	Engineering Lab.	2	M.E. 118	Engineering Lab.	2
M.E.*	Adv. Mech. Engr.	3		Adv. Engr. Elec.	3
M.E. 121	Adv. Mach. Design	3	Met. 34	Metallurgy Lab.	1
Met. 33	Metallurgy Lab.	1		Elective	3
	Elective	3	P.E. 8	Physical Education	—
P.E. 7	Physical Education	—			
		18			18

* M.E. 100, 116, 117, or 119.

† M.E. 120, 122, 123, or 125.

THE CURRICULUM IN METALLURGICAL ENGINEERING

Metallurgical Engineering formerly signified the production and refining of metals for industrial and military use. More recently the applications of science to alloying, rolling and forging, heat treatment, machining, and welding, the later stages in the manufacturing processes, have widened the field. A sound general education, coupled with thorough grounding in basic science and general engineering, remain, however, the wisest preparation for the specialist in any of these fields.

Outside of the basic studies in science, general engineering, and metallurgy required of all for the degree, flexibility is provided in the curriculum to permit its adaptation to the individual abilities, prospects, and plans of the student by limited "Electives" and "Professional Subjects." Thus, outside of the essential basic subjects, he may develop in the direction of research with advanced courses in chemistry, physics, mathematics, German, and research; toward plant operation with electives such as labor problems, psychology, and industrial management; or toward the business side of metallurgy with courses such as advanced economics, sociology, and accounting—all without jeopardizing the soundness and adequacy of his basic engineering education.

The hours called "General Study" are for the purpose of providing the student with some mature understanding of the social and human aspects of the world in which he will make his way as an engineer. Typical "General Study" Options are listed opposite. The student's choices of elective courses will be approved, of course, only after individual consultation with the curriculum director.

Electives may also be used in preparation for electrometallurgy, which includes four subjects in the department of electrical engineering and an additional course in electrometallurgy instead of one of the courses in iron and steel.

THE CURRICULUM IN METALLURGICAL ENGINEERING

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Chem. 36	Quant. Analysis	2	Eco. 4	Economics	3
Chem. 48	Quant. Anal. Conf.	1	Math. 14	Inter. Calculus	3
Eco. 3	Economics	3	Met. 8	Intro. to Met.	2
Math. 13	Calculus	3	Phys. 23	Dynamics & Heat.	4
Met. 7	Intro. to Met.	2		*General Study	3
Phys. 24	Elec. & Magnetism	4	Mil. 4	Military Science	2
Mil. 3	Military Science	2	E.C. 4	Engr. Conferences.	—
E.C. 3	Engr. Conferences.	—	P.E. 4	Physical Education	—
P.E. 3	Physical Education	—			
		17			17

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
C.E. 9	Mech. of Materials	3	Chem. 7	Inorg. & Phys. Chem.	3
C.E. 10	Mat. Testing Lab.	1	Geol. 10	Prin. of Geology	3
Engl. 3a	Types of World Lit.	3	Met. 52	Met. of Iron & Steel	3
Geol. 2	Mineralogy	2	Met. 62	Met. Problems	1
Met. 125	Electrochemistry	2	Met. 131	Metallography	3
Met. 130	Phys. Metallurgy	3		*General Study	3
Met. 135	Elec. Chem. Lab.	1		**Elective	3
	*General Study	3	P.E. 6	Physical Education	—
P.E. 5	Physical Education	—			
		18			19

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
Chem. 190	Phys. Chemistry	3	M.E. 29	Heat Engines	3
E.E. 58	Elec. Machinery	3	Met. 54	Met. of Zinc, Aluminum, etc.	2
E.E. 59	Dynamo Lab.	1	Met. 140	Met. Colloquium	1
Met. 53	Met. of Copper, Lead, etc.	3	Met. 152	Adv. Met. I. & S.	3
Met. 139	Met. Colloquium	1	Met. 164	Met. Problems	1
Met. 163	Met. Problems	1		‡Professional Subjs.	6
	‡Professional Subjs.	3		Elective	3
	Elective	3	P.E. 8	Physical Education	—
P.E. 7	Physical Education	—			
		18			19

* Suggested General Study Options (others may be chosen, all must be approved).

1. History of Civilization.
   Hist. 13 and 14. U. S. History, or Govt. 1, Foundations of Government. Govt. 163 and 164, Cont. Political Thought.
2. History of Science and Thought.
   Phil. 3, Introduction to Philosophy, or Gk. 99, Ancient Science, or Phil. 14, Logic and the Scientific Method.
3. Literature and the Fine Arts.
   Engl. 3b, Types of World Lit., or Engl. 121 and 122, Cont. Lit., or Fine Arts 11 and 12, Ancient and Medieval Art and Art of the Italian Renaissance.
4. Social Science.
   Soc. 161 and 162, Sociology, or Eco. 107 and 108, Advanced Economics, or Eco. 133 and 134, Labor Problems.
5. Science.
   Biol. 13, Human Biology, or Psych. 1, Introduction to Psychology, or Astr. 1, Descriptive Astronomy.

‡ Must be chosen with written approval of curriculum director.

** In preparation for electrometallurgy, E.E. 50 and 51 are elected here and in senior year E.E. 40, 52 and 53, 54 and 55, and Met. 108; E.E. 58 and 59 are omitted and Met. 152 is not required.

THE CURRICULUM IN MINING ENGINEERING

Mining engineering concerns itself with the search for, extraction from the ground, and the initial preparation of the minerals and rocks that are needed to meet the demands of our modern civilization. So basic is the mining industry, so dependent on it are all individuals and industries, that ours has been called a "mineral civilization". Three great classes of materials are provided by the mining engineer: mineral fuels, including coal, petroleum and natural gas; ores of the metals; non-metallics, such as slate, limestone, gypsum, sand and gravel, and scores of others.

All the operations at the mine are within the responsibility of the mining engineer. The actual work of extraction may be only one of his activities, for he may also have to deal with exploration, plant construction, transportation, preparation and processing, and all phases of mine administration. Modern mining has become, in many cases, a mass-production industry. The mechanization of mines has gone forward with startling rapidity. Electrical applications are found in every phase of the industry. The need for engineering training was never more important.

The curriculum in mining engineering includes the basic science common to all branches of engineering—mathematics, physics. chemistry and mechanics. The study of geology is begun in the sophomore year. During the last two years a thorough and progressive training is given in the principles of mining and the methods used in extraction. Special attention is directed to the mechanization of mine operations; to mine ventilation, transportation, economics and administration; and to coal preparation and ore dressing. Technical courses in civil, electrical and mechanical engineering form a part of this advanced work.

Interwoven with the technical program is a series of required courses and electives which offers great flexibility in caring for the needs of the individual student. Wise planning permits, without sacrifice of technical strength, a basic program in business administration consisting of such courses as labor problems, cost accounting, statistical method, money and banking, and corporation finance. Another, desiring to specialize in geology, finds ample opportunity to build a strong program in this field, including geophysics. On the other hand the student who wishes more work in technology can have it, or if he prefers additional courses in general subjects his desires can be met.

THE CURRICULUM IN MINING ENGINEERING

FRESHMAN YEAR

See page 79

SOPHOMORE YEAR

FIRST SEMESTER			SECOND SEMESTER		
Number	*Title*	*Cr.Hrs.*	*Number*	*Title*	*Cr.Hrs.*
Chem. 36	Quant. Analysis	2	Eco. 4	Economics	3
Chem. 48	Quant. Anal. Conf.	1	Geol. 10	Princ. of Geology.	3
Eco. 3	Economics	3	Math. 14	Inter. Calculus	3
C.E. 6a	Land Surveying	3	Min. 6	Mine Surveying	3
Math. 13	Calculus	3	Phys. 24	Elec. & Magnetism	4
Phys. 23	Dynamics and Heat	4	Mil. 4	Military Science	2
Mil. 3	Military Science	2	E.C. 4	Engr. Conferences.	—
E.C. 3	Engr. Conferences.	—	P.E. 4	Physical Education	—
P.E. 3	Physical Education	—			
		18			18

JUNIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
C.E. 9	Mech. of Materials	3	Acctg. 4	Accounting	3
C.E. 10	Mat. Testing Lab.	1	C.E. 13	Hydraulics	2
Geol. 1	Mineralogy	3	C.E. 14	Hydraulics Lab.	1
	*General Study	3	Geol. 8	Historical Geol.	3
M.E. 29	Heat Engines	3		*General Study	3
Met. 21	Metallurgy	2	Geol. 5	Petrology	3
Met. 81	Met. Problems	1	Min. 22	Mining Methods	3
Min. 21	Min. Fundamentals	3	P.E. 6	Physical Education	—
P.E. 5	Physical Education	—			
		19			18

SENIOR YEAR

FIRST SEMESTER			SECOND SEMESTER		
E.E. 50	Dyn. & Motors	2	C.E. 30	Struct. Design	3
E.E. 51	Dynamo Lab.	1	E.E. 52	Alt. Currents	2
Min. 103	Mine Ventilation.	3	E.E. 53	Dynamo Lab.	1
Min. 105	Mine Administra.	2	Min. 104	Haulage, Hoisting & Pumping	3
Min. 107	Ore Dressing & Coal Prep.	3	Min. 106	Mining Economics.	3
	Approved Elective.	6	Engl. 42	Technical Writing.	3
P.E. 7	Physical Education	—		Approved Elective.	3
			P.E. 8	Physical Education	—
		17			18

* Chosen from the following fields: History of Civilization; History of Science and Thought; Literature and the Fine Arts; Social Sciences; Science. See footnote at bottom of page 97 for suggested courses.

The Graduate School

THE GRADUATE SCHOOL

Administrative Officers

Clement Clarence Williams, *President of the University*
Tomlinson Fort, *Dean of the Graduate School*
George Bartlett Curtis, *Registrar*
Earl Kenneth Smiley, *Director of Admissions*
Robert Pattison More, *Executive Secretary of the Graduate Faculty*

Faculty

Carl Elmer Allen.....*Accounting*
Harold Victor Anderson.....*Chemistry*
Allen Jennings Barthold.....*Romance Languages*
Paul Leverne Bayley.....*Physics*
Claude Gillette Beardslee.....*Moral and Religious Philosophy*
Jacob Lynford Beaver.....*Electrical Engineering*
Frank Chester Becker.....*Philosophy*
Sylvanus A. Becker.....*Civil Engineering*
Charles Clarence Bidwell.....*Physics*
Wallace Robert Biggs.....*Journalism*
Robert Dominick Billinger.....*Chemistry*
Frederick Alden Bradford.....*Finance*
Cornelius Godfrey Brennecke.....*Electrical Engineering*
Allison Butts.....*Metallurgy*
Alfred Copeland Callen.....*Mining Engineering*
Neil Carothers.....*Economics*
Preston Banks Carwile.....*Physics*
James Lowry Clifford.....*English*
Wray Hollowell Congdon.....*Education*
Roy Burford Cowin.....*Accounting*
Herbert Maynard Diamond.....*Economics and Sociology*
Alpha Albert Diefenderfer.....*Chemistry*
Gilbert Everett Doan.....*Metallurgy*
William Joseph Eney.....*Civil Engineering*
Amos Aschbach Ettinger.....*History*

Warren Walter Ewing.....*Chemistry*
Tomlinson Fort.....*Mathematics and Astronomy*
Merton Otis Fuller.....*Civil Engineering*
Lawrence Henry Gipson.....*History and Government*
Wilson Leon Godshall.....*History and Government*
James Larmour Graham.....*Psychology*
George Dewey Harmon.....*History*
Thomas Huger Hazlehurst.....*Chemistry*
Arthur Warner Klein.....*Mechanical Engineering*
Kenneth Worcester Lamson.....*Mathematics*
Fred Viall Larkin.....*Mechanical and Industrial Engineering*
Archie Roscoe Miller.....*Electrical Engineering*
Benjamin LeRoy Miller.....*Geology*
Robert Pattison More.....*German*
Harvey Alexander Neville.....*Chemistry*
Philip Mason Palmer.....*German*
Harry Gordon Payrow.....*Civil Engineering*
Max Petersen.....*Physics*
George Emil Raynor.....*Mathematics*
Joseph Benson Reynolds.....*Mathematics*
Edgar Heisler Riley.....*English*
Ernst Bernhard Schulz.....*Government*
Jonathan Burke Severs.....*English*
Clarence Albert Shook.....*Mathematics*
Charles Wellington Simmons.....*Chemical Engineering*
Lloyd LeRoy Smail.....*Mathematics*
Robert Metcalf Smith.....*English*
Milton Caleb Stuart.....*Mechanical Engineering*
Hale Sutherland.....*Civil Engineering*
Edwin Raymond Theis.....*Chemical Engineering*
Stanley Judson Thomas.....*Biology*
Francis John Trembley.....*Biology*
Lawrence Whitcomb.....*Geology*
Bradford Willard.....*Geology*
Horace Wetherill Wright.....*Latin*

Executive Committee of the Graduate Faculty

President Williams; Dean Fort, *Chairman;* Professor More, *Executive Secretary;* Professors Neville, Doan, Willard, Smith, and Barthold.

THE GRADUATE SCHOOL

Opportunity for graduate study was contemplated at Lehigh from its beginning and was announced in its first Register in 1866. More definite organization of the work along lines that are now generally accepted dates from 1883. Since that time the degrees of Master of Arts and Master of Science have been offered without interruption. The degree of Doctor of Philosophy was also announced for a time and twice conferred. In the middle nineties this degree was withdrawn and doctoral work was not again offered until 1936, when it was once more authorized by the trustees. In this same year the Graduate School was organized, with a graduate faculty which has full power to enact the necessary legislation governing the work of the School. The faculty is composed of the president of the University and all professors and associate professors who give work for graduate credit. The rules and regulations of the faculty are administered by an executive committee composed of the president of the University, the dean of the Graduate School, the executive secretary of the graduate school faculty, and five elected members of the graduate faculty.

At present, Lehigh University offers to qualified students in various branches of literature, science, and technology advanced instruction leading to the degrees of Master of Arts and Master of Science and, in a more limited number of fields, work leading to the degree of Doctor of Philosophy.

Major work leading to the master's degree may be taken in the following fields: bacteriology, biology, chemical engineering, chemistry, civil engineering, education, electrical engineering, English, French, geology, Greek, history and government, industrial engineering, Latin, mathematics, mechanical engineering, metallurgical engineering, mining engineering, philosophy, physics, psychology, and Spanish. In the fields of accounting, economics, finance, German, and sociology, major work is not offered, but students majoring in other fields may take collateral work in these fields from the list of courses for advanced undergraduates and graduates ("100" courses).

Work leading to the doctorate is offered in the following fields: chemical engineering, chemistry, civil engineering, electrical engineering, English, geology, history, mathematics, mechanical engineering, metallurgical engineering, and physics.

Prospective students who are interested in graduate work in particular fields are in all cases advised to get in touch with the heads of the departments in question before attempting to register. Such consultation will be to their benefit in that they will get a definite understanding as to the adequacy of their preparation, as well as of the facilities the University has to offer for work in their fields.

Admission to Graduate Standing

A student who has taken the bachelor's degree or a degree in technology at a recognized college, university, or technical institution may be admitted as a graduate student. He must file at the office of the director of admissions a statement, on a form provided for the purpose, of his collegiate experience and of his graduate objectives, and an official transcript of his academic record. If this is satisfactory, he will then be admitted to graduate standing. Filing a transcript is not necessary in the case of work done at Lehigh University.

Admission to graduate standing permits the student to take any course for which he has the necessary qualifications. *It does not imply admission to candidacy for a degree.* Admission to candidacy for an advanced degree is granted in accordance with the provisions set forth below under "Degrees."

Women are admitted as graduate students on the same terms as men. However, women are not admitted either as registered students or as listeners in courses primarily for undergraduates (courses numbered from 1 to 99), and their enrollment in courses open to advanced undergraduates and graduates ("100" courses), is subject to the special approval of the head of the department concerned. These restrictions do not apply during the summer semester.

Students of Lehigh University who are within a few hours of meeting the requirements for the bachelor's degree may, if given permission by the graduate faculty, enroll for a limited amount of work for graduate credit.

Registration

The registration days for graduate students each semester are the Thursday, Friday, and Saturday following the undergraduate registration days (see calendar). The last day for graduate registration is the tenth day of instruction.

It should be noted that the graduate work itself starts promptly at the beginning of the semester. It is frequently true that graduate courses can only be given if there is a certain minimum demand for them. Delay in enrolling for the course may therefore result in causing the course to be withdrawn for the semester.

Tuition and Fees

The tuition for graduate courses is at the rate of $10.00 per semester hour.

All new students pay, once only on admission, a matriculation fee of $5.00. Students at graduation pay a graduation fee of $10.00.

A library fee of $2.50 per semester and a health service fee of $6.00 per semester are paid by all students registered for the regular semesters, except those registered for fewer than seven hours per semester.

Graduate students in residence who have met all course and residence requirements for the doctoral degree pay a dissertation fee of $50.00 per semester.

For an unregistered master's thesis prepared in absentia, a reading fee of $25.00 is charged.

For a doctoral dissertation prepared in absentia a reading fee of $50.00 is charged.

Graduate students are given the option of paying or not paying the athletic fee of $15.00 a year and the student activities fee of $2.50 per semester. If they pay these fees, they obtain the corresponding benefits.

There are also laboratory fees or deposits in laboratory courses to cover the cost of laboratory supplies used by the individual students and to provide for breakage of glassware and instruments. The amounts of these fees and deposits are given in the description of courses in connection with each laboratory course.

Refunds

For university regulations concerning refunds, see page 33.

Members of the University Staff

Full-time members of the university staff may not take more than six semester hours of graduate work in any one semester; half-time members of the staff may not take more than ten semester hours.

Filing of Application for Degree

Candidates for degrees on University Day file on or before May 15 a written notice of candidacy for the degree, which notice shall bear the bursar's receipt for the required graduation fee of $10.00; candidates for degrees on Founder's Day file a similar notice of candidacy on or before September 25; candidates for degrees at the Midyear Commencement file before January 15. A blank to be used for this purpose is supplied by the registrar's office and filed with the bursar at the time of payment of the graduation fee. Failure to file such notice by the dates mentioned debars the candidate from receiving the degree at the ensuing graduation exercises. A candidate who pays his graduation fee and then fails to qualify for his degree will, on application, receive a refund of the fee.

DEGREES

Master of Arts and Master of Science

The master's degree is granted to properly qualified students who complete satisfactorily a full year of advanced work. In meeting the requirements for the degree, the student must comply with the following regulations:

1. All work which is to be credited toward a master's degree must be done in actual and regular attendance at Lehigh University.

2. A minimum of thirty semester hours is required for the master's degree.

3. Each candidate for a degree must submit for the approval of the graduate faculty the program of courses he proposes to take to satisfy the requirements for the master's degree. This program must have the approval of the head of the major department, and also of instructors in such courses, not in the major field, as may be included. Approval of the program by the graduate faculty signifies that the candidate has been formally admitted to candidacy for the degree.

4. At least eighteen of the required thirty semester hours must be taken in one department, which shall be the student's major department or field. The remaining twelve hours, or any part of them, may also be taken in the major department; or they may be taken in any other field in which courses for graduate credit

are given, as the needs or interests of the student may indicate. The distribution of the work shall be made upon the advice and with the approval of the head of the major department. In all cases, the work for the master's degree must be taken under at least two instructors.

5. At least twelve of the eighteen semester hours required in the major department and at least fifteen of the thirty semester hours required for the degree must be taken in courses open primarily to graduates ("200" courses). Courses primarily for undergraduates are not accepted for graduate credit.

6. A thesis may be required by the major department. If required, the thesis shall not count for more than six semester hours. The credit to be allowed shall be fixed by the head of the major department. Two bound typewritten copies of the thesis (one of which shall be an original copy), approved by the faculty member under whom the work was done and by the head of the major department, shall be placed in the hands of the secretary of the graduate faculty at least two weeks before the day on which the degree is to be conferred. Information as to the form in which the thesis must be presented may be obtained from the librarian of the University or from the executive secretary of the graduate faculty.

7. The master's degree is not granted unless the candidate has earned the grades A or B in at least eighteen hours of the work on his program. No course in which the grade earned is less than C is credited toward the degree.

When all requirements have been met, the candidate is recommended by the faculty to the trustees for the master's degree appropriate to the work pursued.

Doctor of Philosophy

The degree of Doctor of Philosophy is conferred on candidates who have demonstrated general proficiency and high attainment in a special field of knowledge and capacity to carry on independent investigation in that field as evidenced by the presentation of an acceptable dissertation embodying the results of original research. The requirements for the degree are more specifically set forth in the following regulations.

1. TIME REQUIREMENTS. A candidate is ordinarily expected to devote three or more academic years to resident graduate study. In no case is the degree awarded to one who has spent less than two full academic years in resident graduate work. Study for any specified period of time, however, is not in itself regarded as sufficient ground for the award of the degree.

Graduate work done in residence at other institutions will be accepted in partial fulfillment of the time requirements, provided such work is approved by the graduate faculty and by the departments concerned.

Work of fragmentary character scattered over a long peiod ot years, or work completed many years before the student becomes a candidate for the degree at Lehigh will be reviewed by the graduate faculty and may be credited in part or in whole towards the fulfillment of the time requirements.

2. RESIDENCE REQUIREMENTS. A candidate for the degree must complete at least one full academic year of resident graduate study at Lehigh University.

3. ADMISSION TO CANDIDACY. Candidates for the doctorate are accepted in a limited number of departments only, and a department may limit the number of candidates accepted in any year. In exceptional cases new students may be admitted to candidacy immediately upon registration in the Graduate School. Ordinarily, however, they are required to spend at least one semester in residence before they are accepted as candidates. Admission to candidacy is granted by the graduate faculty, following written application by the student, upon the recommendation of the departments concerned. In passing upon a student's application, his general education, as well as his special qualifications for work in his chosen field, is taken into consideration. Each applicant is notified by the executive secretary of the graduate faculty, in writing, of the action of the faculty upon his application.

The application of a foreign student must be accompanied by a statement from the department in which he intends to specialize, certifying that he has a satisfactory command of English.

At the time of admission to candidacy a special committee is appointed by the executive committee of the graduate faculty to direct the work of the candidate.

4. Plan of Work. The preparation for the degree is based on the study of a major subject, to which one or two minors may be added. The program of work to be formulated by the candidate, his special committee, and the head of his major department, should be planned to lead to a general mastery of the major field and to a significant grasp of any minor that may be added. The program must be approved by the executive committee of the graduate faculty.

While there is no definite requirement as to the number of courses to be taken, two years devoted to formal courses is the customary minimum. In no instance, however, is the degree awarded merely for the faithful completion of any program of courses.

5. Language Requirements. The candidate must give evidence, through examination, of a reading knowledge, sufficient for the purposes of his special studies, of at least two foreign languages (in addition to any language which may constitute his major subject). In each case the required languages are designated by the candidate's major department and approved by the graduate faculty. The language requirements must be satisfied before the student presents himself for the general examination, described below.

Language examinations are in charge of a committee consisting of representatives of the language department concerned and of the candidate's major department.

Permission to take the language examinations does not imply admission to candidacy for the degree.

6. General Examination. The general examination for the doctorate is designed to test both the student's capacity and his proficiency in his field of study. The examination is not necessarily confined to the content of courses that have been taken at Lehigh University or elsewhere. It is ordinarily held not earlier than toward the close of the second year of work, nor later than seven months prior to the time when the candidate plans to receive the degree. The student's special committee is in charge of the examination, which is both written and oral.

Application for admission to the general examination must be filed with the executive secretary of the graduate faculty at least one month before the time of the examination. No student

is permitted to take this examination who has not been admitted to candidacy for the doctorate or who has not satisfied the language requirements.

Should a candidate fail in the general examination, he may be permitted by the graduate faculty to present himself for a second examination not earlier than five months after the first. If the results of the second trial are also unsatisfactory, no further examination is set.

7. DISSERTATION. The candidate is required to present a dissertation prepared under the general direction of a professor at Lehigh University. The dissertation shall treat a topic related to the candidate's major subject, embody the results of original research, give evidence of high scholarship, and constitute a contribution to knowledge. It must be approved by the professor under whose direction it was written, by the candidate's special committee, and by the graduate faculty. A copy bearing the written approval of the professor in charge must be presented to the executive secretary of the graduate faculty for transmission to the student's special committee not later than April 1, if the degree is to be conferred in May, or not later than September 1, if the degree is to be conferred in October.

The candidate shall deposit with the executive secretary of the graduate faculty, at least one week before the degree is to be conferred, (1) two typewritten copies (one an original copy) of the accepted dissertation, in standard form and binding; (2) an abridgement of the dissertation in a form suitable for publication and acceptable to the candidate's special committee. At the same time he shall deposit with the bursar of the University the sum of fifty dollars ($50.00). This deposit will be refunded if the dissertation, or an acceptable summary including all its major results, is published within two years after the degree is awarded, in a place and form approved by the executive secretary of the graduate faculty. Otherwise the deposit will be used by the University to defray the cost of printing and distributing the original abridgment. The period of two years may be extended at the discretion of the graduate faculty.

8. FINAL EXAMINATION. After the dissertation has been accepted by the graduate faculty, the candidate will be orally examined by the officers of professorial rank in the departments con-

cerned and such other persons as may be selected by the candidate's special committee. This examination is ordinarily held not later than May 1 of the last year of candidacy.

The candidate shall arrange the time for the examination with the executive secretary of the graduate faculty. Such arrangement must be made not later than April 1 if the degree is to be conferred in May, and not later than June 1 if the degree is to be conferred in October.

Post Doctoral Work

Students who have completed the requirements for the doctorate may enroll for post doctorate individualized study under the guidance of selected members of the faculty. Such a program of study contemplates a broad educational and research development at advanced and mature levels, and provides opportunities to prepare for specific positions. A formal certification of such work as may be accomplished by the student will be made.

Description of Courses

DESCRIPTION OF COURSES

Following is a list of the undergraduate and graduate courses offered by Lehigh University. The number of credit hours of each course is indicated by the figure in parentheses. Three hours of drawing, of work in the laboratory, or of practice in the field are regarded as equivalent to a recitation or lecture of one hour's duration. Under the accelerated program with students entering each semester, many courses designated as first semester courses will be taught also in the second semester and *vice versa* in accordance with student needs. The spring, summer, and fall semesters of 1944 are first, second, and first semesters respectively.

Prerequisites

Prerequisites are of two kinds: primary prerequisites which are strictly essential; secondary prerequisites which are highly desirable but not absolutely essential. Secondary prerequisites may be waived by the head of the department concerned. In the following description of courses, primary prerequisites are printed in italics and secondary prerequisites in roman type. Junior standing is a primary prerequisite of all courses in the "100" group.

ACCOUNTING

PROFESSOR COWIN
ASSOCIATE PROFESSOR ALLEN
DEAN CAROTHERS

ACCOUNTING

Acctg. 1. Accounting (3).

The elementary principles of accounting with problem work to develop a knowledge of accounting method and practice. Financial statements and their preparation, analysis and recording of transactions, journalizing and posting, use of special ledgers and journals, adjusting and closing accounts. First semester.

Acctg. 2. Accounting (3).

Elementary accounting problems peculiar to proprietorships, partnerships, and corporations; manufacturing enterprises; depreciation; and a more detailed consideration of financial statements than is possible in Acctg. 1. Prerequisite: *Acctg. 1.* Second semester.

Acctg. 4. Accounting for Engineers (3).

An intensive course in the principles and practices of accounting, covering the fundamentals in one semester. Especially designed for engineering students. Prerequisite: *junior standing.* First and second semesters.

For Advanced Undergraduates and Graduates

Acctg. 113. Advanced Accounting (3).

Problems of the balance sheet, its form and content, the valuation of assets, liabilities, and problems relating to capital stock, surplus, and reserves. Prerequisites: *Acctg. 2 or 4.* First semester. Mr. Cowin

Acctg. 114. Advanced Accounting (3).

Problems of profit and loss statements, income, receiverships and bankruptcy, estates, and consolidated statements. Prerequisites: *Acctg. 2 or 4.* Second semester. Mr. Cowin

Acctg. 115. Cost Accounting (3).

The principles and methods used to determine unit costs of product or services. Material, labor, and overhead costs, methods of distributing overhead, and the application of cost principles to job order and process production. Prerequisite: *Acctg. 2 or 4.* First semester. Mr. Allen

Acctg. 118. Advanced Cost Accounting (3).

Special cost problems such as: standard costs, distribution costs, joint costs. The managerial use of cost data, control of costs, and design of cost accounting systems. Prerequisite: *Acctg. 115.* Second semester. Mr. Allen

Acctg. 120. Auditing (3).

The different types of audits and special investigations. Problems involving audit principles and procedure; methods of detecting and preventing fraud; the writing of audit reports; the ethics and the legal responsibilities of accountants. Prerequisite: *Acctg. 2 or 4.* Second semester. Mr. Allen

Acctg. 171. Readings in Accounting (3).

An unrostered course designed for students in the College of Arts and Science majoring in accounting, and for students in the College of Business Administration having special interest in some phase of accounting not covered by the rostered courses. The study may be in the history of accounting, accounting theory, municipal or public utility accounts, or any special subject approved by the instructor. Prerequisites: *senior standing and Acctg. 2 or 4.* First semester. Mr. Cowin

Acctg. 172. Readings in Accounting (3).

Continuation of Acctg. 171. Prerequisites: *senior standing and Acctg. 2 or 4.* Second semester. Mr. Cowin

ECONOMIC STATISTICS

For Advanced Undergraduates and Graduates

E.S. 145. Statistical Method (3).

The methods of statistical description and induction, including tabular and graphic analysis and presentation. Prerequisite: *Eco. 4.* First semester.

E.S. 146. Business Cycles and Forecasting (3).

The nature of the business cycle and the application of statistics to business trends, with special attention to forecasting and business barometers. Prerequisite: E.S. 145. Second semester.

E.S. 147. Statistical Analysis (3).

Analysis of the problem of measuring economic categories such as industrial growth, national income, price variation, and demand. The significance of data; method. Not offered in 1944. Prerequisite: *E.S. 146.* Fist semester.

E.S. 148. Advanced Business Cycles (3).

Recent business cycle theories; the evolution of the theories, and the problems of economic change which the theories attempt to explain. Prerequisite: *E.C. 146.* Not offered in 1944. Second Semester.

LAW

Law 2. Business Law (3).

A course designed primarily for students of accounting. The law of partnership, corporations, property, personal relations, insurance, transportation, bailments, patents, copyrights, and trademarks. Prerequisite: Eco. 4. Second semester.

For Advanced Undergraduates and Graduates

Law 102. Business Law (3).

The law of contracts, sales, negotiable instruments, and bankruptcy. Prerequisite: Eco. 4. Second semester. Mr. Carothers

Law 103. Federal Tax Law (3).

The most recent revenue acts; procedure in using the law and regulations to determine the amount of the tax liability. Income tax, estate tax, gift tax, capital stock tax, excess profits tax, and other related federal taxes. Prerequisite: *Acctg. 2 or 4.* First semester. Mr. Cowin

ASTRONOMY

See Mathematics and Astronomy

ATHLETICS

See Division of Intercollegiate Athletics

BIOLOGY

PROFESSOR S. J. THOMAS
ASSOCIATE PROFESSOR TREMBLEY
ASSISTANT PROFESSOR PARKER

Biol. 1. Biology (3).

General distribution requirements for arts students who do not intend to major in biology. Topics studied are: protoplasm, metabolism of lower forms of life, anatomy and physiology of multicellular animals. Origin

of life, genetics, and eugenics. Evolution. Two recitations and one laboratory period per week. Fee, $3.00. First semester.

Biol. 2. Mammalian Anatomy (2).

Detailed dissection of a mammal. Two laboratory periods a week. Prerequisite: Biol. 10 or its equivalent. Fee, $5.00. Second semester.

Biol. 3. Comparative Anatomy of Vertebrates (3).

The dissection of types of the several veterbrate classes in the laboratory. Recitations on functional and anatomical differences. Prerequisite: Biol. 10 or its equivalent. Fee, $3.00. First semester.

Biol. 4. Vertebrate Embryology (3).

A lecture, recitation, and laboratory course on the development of vertebrates. Laboratory work on the embryology of an amphibian and the chick, demonstrating the successive stages of cleavage, gastrulation, germ layer formation, and development of tissues and organs. Prerequisites: *Biol. 10 or its equivalent;* Biol. 3. First semester.

Biol. 6. Botany (3).

Fundamentals of the morphology and physiology of plants. The evolutionary development of the plant kingdom. Two lectures and one laboratory period per week. Field trips in the spring. Fee, $3.00. Second semester.

Biol. 7. Elementary Biology (3).

A survey course in biological principles leading to an understanding of man's place in his living and non-living environment.

Biol. 8. Elementary Biology (3).

Continuation of Biol. 7. The theories of genetics, eugenics, and human evolution. Prerequisite: Biol. 1 or 7. Second semester.

Biol. 10. Zoology (3).

A foundation course for majors in biology. Living things are studied from a functional rather than purely morphological viewpoint. Protoplasm, cellular metabolism, reproduction, and other fundamental conceptions of life-processes. Recitations, lectures, and laboratory. Fee, $3.00. First semester.

Biol. 11. Animal Ecology (3).

A recitation, lecture, laboratory, and field course in the fundamentals of animal taxonomy and conservation. Basic interrelationships between animals and their physical and biological environments, animal successions, type habitats, and economic ecology. Laboratory work in the morphology of the invertebrate phyla and the classes of vertebrates. Observations of animals in their local habitats. Prerequisite: Biol. 1 or its equivalent. Fee, $3.00. Second semester.

Biol. 13. Human Biology (3).

Fundamental principles of biology using man as a type. Man's place in nature. The biology of the individual. Protoplasm. The body as a whole. Man's organ system. Group biology. Man in relation to his environment. Genetics and human inheritance. The future of man. Human evolution. First and second semesters.

Biol. 14. Genetics and Eugenics (1).

Designed for students who are not majoring in biology. The laws of heredity, modern conception of the gene, natural and artificial mutations. the mechanism of evolution, evolutionary trends of the human race, and methods of eugenics betterment. Second semester.

Biol. 15. Freshman Hygiene.

Four lectures on social hygiene, with the cooperation of the director of the students' health service. Given during freshman week. Required of all freshmen. Either this course or Biol. 16 must be passed before graduation.

Biol. 16. Social Hygiene.

For students who have not passed Biol. 15. Second semester.

Biol. 18. Genetics (2).

A study of the basic laws governing inheritance in plants and animals, chromosome behaviour, nature of genes. The relation of environmental modifications, hybrid variations, and mutations to the mechanics of evolution. Prerequisite: Biol. 10 or its equivalent. Second semester.

Biol. 20. Physiology (3).

Recitations and demonstrations covering the principles underlying the operation of life-processes. The subject matter is not limited to any one group of organisms, but is derived from living things in general. Prerequisites: Biol. 3, 10; Chem. 150; *Phys. 12, 16, and 17.* Second semester.

Biol. 21. Hygiene (3).

A recitation course in the physiology and anatomy of the human body. The evolution and development of organs and systems. Their structures, functions, and interrelationships as a scientific basis for appropriate attitudes and habits concerning health. Second semester.

Biol. 22. Hygiene (1).

A brief course in the essentials of personal and public health. Designed especially for students who will become responsible for the health habits of others under their supervision or command. First semester.

Biol. 23. Hygiene (1).

A continuation of Biol. 22. Second semester.

Biol. 36. Economic Botany (3).

Economic products of plant origin from the point of view of their development, structural characteristics, uses, and sources. Two recitations and one laboratory period per week. Fee, $3.00. First semester.

Biol. 50. Sanitary Bacteriology (3).

Study of bacteria and allied microörganism by staining and cultural methods; their sanitary importance in public water supplies; the bacteriology of sewage and sewage treatment; qualitative and quantitative bacterological and biological analysis of water, milk, and sewage. Lectures, recitations, and laboratory work. Fee, $3.00. Second semester.

Biol. 52. Bacteriology (3).

Elementary general bacteriology. The morphological and cultural characteristics of bacteria and allied microörganisms; special attention to forms of sanitary and economic importance; the role of bacteria, yeasts, and molds in fermentation industries, in water and milk, and in disease. Lectures, recitations, and laboratory work. Fee, $3.00. First semester.

Biol. 54. Bacteriology (3).

An elementary course for students specializing in biological sciences. Special staining methods in the study of morphology; differential media in bacterial physiology; thorough study of the microörganisms themselves rather than their specific sanitary or industrial importance. Recitations, lectures, and laboratory work. Fee, $3.00. First semester.

Biol. 55. Biology of Bacteria (3).

A recitation and laboratory course in the study of life processes, using bacteria for demonstration. Cell structure, growth and reproduction, heredity and variation, metabolism, adaption and parasitism, etc., as examples of the relationships of all living things. Fee, $3.00. Second semester.

For Advanced Undergraduates and Graduates

***Biol. 106. Natural History and Ecology (3).**

Identification and life habits of local plants and animals. Laboratory training in the use of analytical keys and of collections of reference, and the correct methods of making collections. Trips to local regions of natural interest for field identification and study of interrelationships of living organisms. Conservation, conservation programs, and appreciation of nature. Three lectures, one laboratory, and one field trip a week. Fee, $2.00. Summer session. Mr. Trembley

Biol. 113. Histology (3).

The technique of fixing, cutting, and differential staining of animal tissue; the recognition of normal mammalian tissues. Prerequisites: Biol. 10 and 3 or their equivalent. Fee, $3.00. Second semester. Mr. Trembley

* This course is not available as part of a graduate major in biology.

Biol. 153. Advanced Bacteriology (3).

A laboratory and recitation course in medical bacteriology; cultural study of the more common pathogenic bacteria. Prerequisite: Biol. 50, 52, or 54. Fee, $3.00. Second semester. Mr. Thomas

Biol. 155. Industrial Bacteriology (3).

An advanced laboratory course In bacteriology including aspects of industrial chemistry in which bacteria play an essential part in the process, as in the manufacture of acetone, butanol, acetic, and lactic acids. Prerequisites: at least two years of chemistry, including quantitative analysis, Biol. 52 or 54. Fee, $3.00. Second semester. Mr. Thomas

Biol. 158. Immunology (3).

A comprehensive recitation course in the history of the study of immunity and modern theories concerning its mechanism. Prerequisite: Biol. 153. First semester. Mr. Thomas

Biol. 161. Public Sanitation (3).

A laboratory study of the biological, chemical, bacteriological, and physical aspects of public water supplies, systems of sewage disposal, and milk distribution. Prerequisite: at least two years of chemistry, including quantitative analysis, Biol. 50, 52, or 54. Fee, $3.00. First semester. Mr. Thomas

For Graduates

Prerequisite for graduate work in biology: the amount of biology usually obtained by an undergraduate majoring in that department. Prerequisite for graduate work in bacteriology: a satisfactory course in undergraduate bacteriology and a sufficient preparation in organic chemistry. Ability to undertake graduate work in bacteriology must be demonstrated by previous scholastic record, an examination, or both.

Biol. 203. Vertebrate Histogenesis and Organogenesis (3).

Careful following, in the laboratory, of the development of a vertebrate; tracing of the history of the germ-layers, organs, and tissues. The association of tissues to form organs. First semester. Mr. Trembley

Biol. 207. Biological Research (3).

Investigations in any phase of the biological sciences according to preparation and interests. First semester. Messrs. Thomas, Trembley

Biol. 208. Biological Research (3).

Continuation of Biol. 207. Second semester. Messrs. Thomas, Trembley

Biol. 209. Advanced Morphology (3).

A laboratoroy course in special phases of morphology, such as comparative osteology, comparative morphology, or embryology of the invertebrates, etc. to meet the individual interest of the student. First or second semester. Mr. Trembley

Biol. 210. Biological Theories (3).

An advanced course in genetics and evolution. First or second semester. Messrs. Thomas and Trembley

Biol. 260. Serology (3).

A laboratory course in the preparation of antigens, immunization of animals, and the study of antigen-antibody reactions. To be taken concurrently with or following Biol. 158. Prerequisite: Biol. 153. First or second semester. Mr. Thomas

Biol. 262. Microbiology (3).

The higher bacteria, yeasts, molds, algae, and protozoa of interest to the bacteriologist. Practical applications to sanitary bacteriology, water supplies, sewage disposal systems, food spoilage and, to a limited extent, human and animal pathology. First or second semester. Mr. Thomas

Biol. 263. Physiology of Bacteria (3).

The biochemistry of bacterial metabolism, zymology, respiration, nutrition, reproduction. First or second semester. Mr. Thomas

Biol. 264. Epidemiology (3).

A seminar dealing with historic epidemics of typhoids, cholera, plague, diphtheria, and the venereal diseases; the methods of transmission of the organisms concerned with mass infections; modern immunological and sanitary practice in prevention. First or second semester. Mr. Thomas

Biol. 265. Industrial Biology (3).

A laboratory course in the preparation and standardization of biological products used in active immunization, diagnosis, and serum therapy. Prerequisite: Biol. 158 and 260. First or second semester. Mr. Thomas

Biol. 266. Public Health Administration (3).

The organization of national, state, and local health services. The relationship between official and volunteer health agencies. The functions of medical health officer, epidemiologist, public health nurse, and sanitary inspectors in a public health program. The various phases of health work, such as eugenics, personal, social and industrial hygiene, sanitation, vital statistics, and public education. First or second semester. Mr. Thomas

Biol. 267. History of Bacteriology (3).

Reading, conferences, and written reports. First or second semester. Mr. Thomas

Biol. 268. History of Biology (3).

A course based on reading, conferences, and written reports. First or second semester. Mr. Trembley

BUSINESS ADMINISTRATION

See Accounting, Economics and Sociology, and Finance

CHEMISTRY AND CHEMICAL ENGINEERING

PROFESSORS NEVILLE, DIEFENDERFER, W. W. EWING
THEIS, SIMMONS, AND ANDERSON
ASSOCIATE PROFESSORS BILLINGER, HAZLEHURST, AMSTUTZ, AND SERFASS
ASSISTANT PROFESSORS BECK, SMULL, FORNOFF, STOOPS AND ZETTLEMOYER
MR. HEISEY

Chem. 1. Elementary Chemistry (2).

Elementary phenomena and principles of chemistry. Lectures illustrated by experiments, diagrams, working drawings, and museum specimens. Given in conjunction with Chem. 11. First and second semesters.

Chem. 2. Elementary Chemistry (2).

Recitations and demonstrations. Primarily for students in the curriculum of arts and science and in the curriculum of business administration. Given in conjunction with Chem. 12. First and second semesters.

Chem. 3. Intermediate Chemistry (2).

A course for students who pass the examination in elementary chemistry held during freshman week. Prerequisite: satisfactory preparation in the rudiments of chemistry. First semester.

Chem. 6. Inorganic Chemistry (3).

Family relationships among the elements. Systematic survey of inorganic chemical compounds, their occurrence, properties, and reactions. Prerequisites: *Chem. 1 and 11, or 3 and 13; Chem. 20;* Chem. 8. First semester.

Chem. 7. Physical Chemistry (3).

Introduction to physical chemistry; states of matter, change of state, solutions, surface phenomena; nuclear, atomic, and molecular structure. Prerequisite: Chem. 6. Second semester.

Chem. 8. Stoichiometry (1).

Chemical problems and reactions. Prerequisites: Chem. 1 and 11, or 2 and 12, or 3 and 13. Second semester.

Chem. 9. Elements of Physical Chemistry (3).

Kinetic theory, change of state, solutions, equilibria, electrochemistry, colloidal phenomena. Especially designed for biology majors. Prere-

quisites: *Chem. 1 and 11, or 3 and 13; Chem. 20;* Chem. 8. Second semester.

Chem. 11. Chemistry Laboratory (2).

Experiments covering a systematic study of the chemical and physical properties of the more important elements and their compounds. Given in conjunction with Chem. 1. Deposit, $15.00. First and second semesters.

Chem. 12. Chemistry Laboratory (1).

An abridgment of Chem. 11. Given in conjunction with Chem. 2. Deposit, $15.00. First semester.

Chem. 13. Chemistry Laboratory (2).

Experiments designed to accompany Chem. 3. Prerequisite: satisfactory preparation in the rudiments of laboratory chemistry. Deposit, $15.00. First semester.

Chem. 14. Chemistry Laboratory (1).

Primarily for arts and science and business administration students. An abridgment of Chem. 13. Deposit, $15.00. First semester.

Chem. 20. Elementary Chemistry and Qualitative Analysis (3).

Chemistry of the metals and their industrially interesting compounds. The fundamental scientific principles of precipitation, and the practice of qualitative analysis by semi-micro methods. Prerequisites: Chem. 1 and 11, or 2 and 12, or 3 and 13. Deposit, $25.00. Second semester.

Chem. 30. Quantitative Analysis (3).

Practical work in the quantitative laboratory, accompanied by lectures and recitations; an introduction to gravimetric analysis method and typical fundamental volumetric processes. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13, 20;* Chem. 8. Deposit, $30.00. First semester.

Chem. 31. Quantitative Analysis (3).

Continuation of Chem. 30. Analysis of metallic products, ores, and alloys of industrial interest chosen to represent the application of quantitative chemical principles to analysis. Prerequisites: *Chem. 1 and 11, or 3 and 13, 20;* Chem. 30. Deposit, $30.00. Second semester.

Chem. 36. Quantitative Analysis (2).

An abridgment of Chem. 30 for mining and metallurgical engineers. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13; 20;* Chem. 8. Deposit, $25.00. First semester.

Chem. 39. Assaying, Coal, Gas, and Oil Analysis (4).

The furnace assay of ores of lead, gold, and silver, and of gold and silver bullion; cyanidization; calculus for slag and slag mixtures; the analysis of boiler water, mine water, coal, coke, tar, gas, petroleum and

petroleum products; calorimetry. Prerequisites: *Chem. 8 and 30, or 36.* Deposit, $30.00. Summer session: a lecture and seven hours of laboratory work each week-day for four weeks. Not offered in 1944-45.

Chem. 41. Quantitative Analysis Conference (1).

Lectures and recitations concerning the scientific foundations and laboratory practice of Chem. 30. Prerequisites: *Chem. 1 and 11, or 3 and 13, 20.* First and second semesters.

Chem. 45. Quantitative Analysis Conference (1).

Continuation of Chem. 41. Lectures and recitations to accompany Chem. 31. Prerequisites: *Chem. 1 and 11, or 2 and 12, or 3 and 13, 20;* Chem. 41. Second semester.

Chem. 48. Quantitative Analysis Conference (1).

Lectures and recitations to accompany Chem. 36. Prerequisites: *Chem 1 and 11, or 2 and 12, or 3 and 13, 20.* First semester.

Chem. 50. Industrial Employment.

During the summer following the junior year students in the curricula in chemistry and chemical engineering are required to gather industrial experience by at least eight weeks' work in industrial plants or laboratories. A written report is required. Not offered in 1943-44.

Chem. 97. Research Chemistry Laboratory (3).

A variant of Chem. 99 requiring 3 credit hours. Deposit, $15.00. Second semester.

Chem. 99. Research Chemistry Laboratory (2).

Advanced study or an investigation involving intensive laboratory and library study. Deposit, $15.00. Second semester.

Among advanced topics in active research are:

Absorption, Analytical Processes
Drying Oils
Engineering Processes
Heterocyclic Organic Compounds
Hydration of Inorganic Salts
Kinetics of Combustion
Photomicrography
Natural and Synthetic Resins
Pigments
Aldol Syntheses
Plastics
Surface Chemistry
Tanning and Leather Technology
X-ray Technique

For Advanced Undergraduates and Graduates

Chem. 110. Modern Aspects of Chemistry for Secondary Schools (3).

Review of the latest developments in chemistry; atomic structure, solutions, electrolytes, acids. Discussion of the proper presentation of such

topics at the secondary school level. Correlation of such material with the current offerings in secondary schools. Open primarily to teachers of chemistry or general science in secondary schools. Summer session.
Mr. Hazlehurst

Chem. 134. Radiation Methods (2).

The application of radiation methods, mainly X-ray methods, to chemical and industrial chemical problems. Prerequisite: senior standing. First semester. Mr. Anderson

Chem. 135. Radiation Methods (2).

Continuation of Chem. 134. Amplification of X-ray diffraction methods. Space groups. Crystal chemistry. Prerequisite: senior standing. Second semester. Mr. Anderson

Chem. 137. Advanced Analytical Chemistry (3).

One conference and two laboratory periods per week. Prerequisite: 8 hours of quantitative analysis. Deposit, $30.00. Second semester.
Mr. Serfass

Chem. 144. Radiation Methods Laboratory (1).

Laboratory in connection with Chem. 134. Prerequisite: senior standing. Deposit, $10.00. First semester. Mr. Anderson

Chem. 145. Radiation Methods Laboratory (1).

Continuation of Chem. 144. Prerequisite: senior standing. Deposit, $10.00. Second semester. Mr. Anderson

Chem. 150. Organic Chemistry (3).

Systematic survey of the typical compounds of carbon; their classification and general relations; study of synthetic reactions. Prerequisites: *Chem. 20, 30.* First semester. Mr. Amstutz

Chem. 151. Organic Chemistry (3).

Continuation of Chem. 150. Prerequisites: *Chem. 20, 30;* Chem. 150. Second semester. Mr. Amstutz

Chem. 155. Qualitative Organic Chemistry (1).

Systematic laboratory study of classification reactions of pure organic substances and mixtures. Applications to the identification of some industrial products. Prerequisites: *Chem. 150, 151, 165, and 166 or 167.* Deposit, $10.00. First semester. Mr. Smull

Chem. 158. Advanced Organic Chemistry (3).

Advanced topics in organic chemistry. Continuation of Chem. 151. Prerequisites: *Chem. 150, 151, 165, and 166 or 167.* First semester.

Chem. 159. Advanced Organic Chemistry (3).

Chemistry of unsaturated compounds; addition reactions, condensations, polymerization. Effect of inhibitors and catalysts. Prerequisites: Chem. 151 and 166 or 167. Second semester. Mr. Smull

Chem. 165. Organic Chemistry Laboratory (2).

Preparation of pure organic compounds. Prerequisites: *Chem. 20;* Chem. 30. Deposit, $30.00. First semester.

Messrs. Smull, Amstutz, Zettlemoyer

Chem. 166. Organic Chemistry Laboratory (3).

Continuation of Chem. 165. Practical methods of saturation, nitration, reduction, diazotization, sulphonation, etc.; preparation of pure compounds; study of the properties of dyes and other commercial products. Prerequisites: *Chem. 20;* Chem. 30 and 165. Deposit, $40.00. Second semester. Messrs. Smull, Amstutz, Zettlemoyer

Chem. 167. Organic Chemistry Laboratory (2).

Similar to Chem. 166, but shorter. Prerequisites: *Chem. 20;* Chem. 30 and 165. Deposit, $40.00. Second semester.

Messrs. Smull, Amstutz, Zettlemoyer

Chem. 168. Advanced Organic Laboratory (2).

The synthesis, characterization, structure determination, and ultimate analysis of organic compounds. Prerequisite: Chem. 165 and 166 or 167. Deposit, $30.00. First semester. Messrs. Smull, Amstutz

Chem. 169, 171, 172. See under Chemical Engineering.

Chem. 179. History and Literature of Chemistry (1).

Chronological development of the science with assigned reading. Survey of reference books and journals. Prerequisites: Chem. 6 and 150. Second semester. Mr. Billinger

Chem. 190. Physical Chemistry (3).

Continuation of Chem. 7. The laws of thermochemistry, solutions, rates of reaction, and chemical equilibrium in homogeneous and heterogeneous systems based on thermodynamic and kinetic concepts. Prerequisites: *Math. 13, Phys. 23 and 24 or 16, 17;* Math. 14, Chem. 7. First semester. Messrs. Ewing, Zettlemoyer

Chem. 193. Physical Chemistry Laboratory (2).

Physical chemical measurements. Prerequisites: *Math. 13, Chem. 30 or 36; Phys. 23, 24, or 16, 17;* Math. 14, Chem. 7. Deposit, $10.00. First semester. Messrs. Ewing, Zettlemoyer

Chem. 194. Physical Chemistry and Electrochemistry (3).

Continuation of Chem. 190. The laws of conductivity, current, electromotive force and energy relations of electrolytes in solutions and in the molten state. Prerequisites: *Math. 13, Phys. 23 and 24 or 16, 17;* Math. 14, Chem. 190. Second semester. Mr. Ewing

Chem. 197. Electrochemistry Laboratory (1).

Experimental study of electrochemical reactions. Measurements of conductivity, current and electromotive force. Prerequisite: *Math. 13, Chem. 30 or 36, Phys. 23 and 24 or 16, 17;* Math. 14, Chem. 190. Deposit, $5.00. Second semester. Messrs. Ewing, Zettlemoyer

For Graduates

The prerequisite for graduate work in chemistry as a major study toward the doctorate or the master's degree are: inorganic chemistry and qualitative analysis (8), quantitative analysis (8), organic chemistry (10), physical chemistry (5), physics (12), and mathematics, including calculus (12). Students of exceptional ability may be able to make up minor deficiencies while carrying graduate work. If the deficiencies are serious, a student can hardly expect to complete the requirements for the master's degree within the minimum time.

Graduate students may choose either chemistry or chemical engineering as the major subject. If chemical engineering is the major subject, a number of courses in chemistry, adapted to the needs of the student, will be taken as collateral work. Other subjects may be chosen in related fields, usually physics and mathematics. Men majoring in chemistry will take collateral work in science, with such engineering topics as may be suited to their objectives. Suggested graduate collateral sequences which carry forward from selected undergraduate electives, see page 84, are:

Business Administration

Acctg. 115. Cost Accounting	Acctg. 118. Adv. Cost Acctg.
Eco. 107. Adv. Economics	Eco. 108. Adv. Economics

Mathematics—Physics

Phys. 160. Intro. to Modern Phys. Theories	Phys. 161. Intro. to Modern Phys. Theories
or Math. 111. Diff. Equations	or Math. 112. Diff. Equations
or Phys. 124. Elec. Discharge through Gases	or Phys. 170. Spectroscopy

Biochemistry

Biol. 155. Industrial Bacteriology	Biol. 161. Public Sanitation
C.E. 128. Sanitary Engr.	C.E. 131. Adv. Sanitary Engr.

Education

Educ. 151. Organ. of Materials of Instruction	Educ. 150. Principles of Secondary Education
Educ. 219. Social Policy and Education	Educ. 130. History of Ed. in Europe

Chem. 200. Inorganic Chemistry Research (4).

Investigation in the field of organic and colloid chemistry. Deposit, $30.00. First semester. Messrs. Neville, Hazlehurst, Fornoff

Chem. 201. Inorganic Chemistry Research (4).
Continuation of Chem. 200. Deposit, $30.00. Second semester.
Messrs. Neville, Hazlehurst, Fornoff

Chem. 202. Advanced Inorganic Chemistry (2).
The periodic system and atomic structure, theories of valence with particular attention to the Werner theory of complex compounds, inorganic free radicals, reactions in non-aqueous media, and study of the properties and reactions of certain elements with emphasis on recent developments. First semester. Mr. Fornoff

Chem. 203. Advanced Inorganic Chemistry (2).
Continuation of Chem. 202. Second semester. Mr. Fornoff

Chem. 230. Quantitative Analysis Research (4).
Investigation of problems in analytic procedures. Deposit, $30.00. First semester. Messrs. Diefenderfer, Serfass, Lafferty

Chem. 231. Quantitative Analysis Research (4).
Continuation of Chem. 230. Deposit, $30.00. Second semester.
Messrs. Diefenderfer, Serfass

Chem. 236. X-ray Research (3).
The investigation of chemical and industrial problems by X-ray diffraction methods. Deposit, $30.00. First semester. Mr. Anderson

Chem. 237. X-ray Research (3).
Continuation of Chem. 236. Deposit, $30.00. Second semester.
Mr. Anderson

Chem. 252. Organic Chemistry: Heterocyclic Compounds (3).
The chemistry of thiophene, pyrrole, furan, pyridine, and their derivatives considered from the viewpoint of recent organic theories of structure and reaction mechanisms. Second semester. Mr. Amstutz

Chem. 258. Topics in Organic Chemistry (3).
Mechanisms, thermodynamics and kinetics of hydrogenation, de-hydrogenation, oxidation; Keto-enol isomerism; molecular rearrangement; catalysts. Some application to practice. Prerequisite: Chem. 158. Second semester. Mr. Zettlemoyer

Chem. 260. Organic Chemistry Research (4).
Investigation of a problem in organic chemistry. Deposit, $30.00. First semester. Messrs. Smull, Amstutz

Chem. 261. Organic Chemistry Research (4).
Continuation of Chem. 260. Deposit, $30.00. Second semester.
Messrs. Smull, Amstutz

Chem. 266. Advanced Organic Preparations (2).

Mainly a laboratory course. Deposit, $30.00. Second semester.
Messrs. Smull, Amstutz

Chem. 271. The Chemistry of the Proteins (3).

A study of the proteins, amino acid and nucleic acids, their properties, composition, degradation products, oxidation and chemical reactions, synthesis, and analysis. Second semester. Mr. Theis

Chem. 272. The Chemistry of the Carbohydrates (3).

A study of the simple and complex sugars, starches, and cellulose, their synthesis, analysis, reactions, biological relations, occurrence, and industrial applications. First semester. Mr. Theis

Chem. 290. Physical Chemistry Research (4).

Investigation of a problem in physical chemistry; vapor pressure and calorimetric studies in the constitution of inorganic salts. Prerequisites: the equivalent of Chem. 190, 193, 194. Deposit, $30.00. First semester.
Messrs. Ewing, Zettlemoyer

Chem. 291. Physical Chemistry Research (4).

Continuation of Chem. 290. Deposit, $30.00. Second semester.
Messrs. Ewing, Zettlemoyer

Chem. 292. Theoretical Chemistry: Kinetics (3).

Kinetic theory of gases and its application to unimolecular and bimolecular reactions. Chain reactions. Explosions. Reactions in solutions. Heterogeneous reactions. Theory of absolute reaction rates. Prerequisites: A good working knowledge of mathematics, Chem. 294. Second semester.
Mr Zettlemoyer

Chem. 293. Theoretical Chemistry: Kinetics (3).

Continuation of Chem 292. Kinetics of explosions of solids. Combustion and explosion of hydrogen and hydrocarbons. Polymerization. Kinetics of organic reactions. First semester. Mr. Zettlemoyer

Chem. 294. Theoretical Chemistry: Thermodynamics (3).

Thermodynamics theory of chemical equilibria; activity method of treating solutions; systematic free energy calculations. Prerequisites: a good working knowledge of mathematics and the equivalent of Chem. 190, 193, and 194. First semester. Mr. Hazlehurst

Chem. 295. Theoretical Chemistry: Thermodynamics (3).

Continuation of Chem. 294. Statistical theory of thermodynamics; heat capacity equations; quantum theory in chemical thermodynamics; reports and discussions on selected topics. Second semester. Mr. Hazlehurst

Chem. 296. Surface Chemistry (3).

Colloidal systems; surface phenomena. Lectures and reports. First semester. Mr. Neville

Chem. 297. Surface Chemistry (3).

Continuation of Chem. 296. Applications of colloid chemistry; contact catalysis; special topics. Lectures and seminar. Second semester.

Mr. Neville

Chem. 298. Advanced Physical Chemistry Seminar (3).

An intensive study of some field of physical chemistry. First and second semesters. Messrs. Ewing, Zettlemoyer

Chem. 299. Physical Chemistry Methods (2).

Advanced course in methods of physical chemistry laboratory practice. Prerequisite: the equivalent of Chem. 193 and 197. Deposit, $30.00. First semester. Mr. Ewing

CHEMICAL ENGINEERING

PROFESSORS SIMMONS, THEIS, AND ANDERSON
ASSOCIATE PROFESSORS BILLINGER, AND SERFASS
ASSISTANT PROFESOR STOOPS

Ch.E. 50. Industrial Employment.

During the summer following the junior year students in the curriculum in chemical engineering are required to gain industrial experience by at least eight weeks' work in industrial plants or laboratories. A written report is required. Not required in accelerated program.

Ch.E. 78. Chemical Engineering (3).

Principles of chemical engineering related to fluid flow, materials, handling, disintegration and mechanical separation. Assigned reading in texts and current literature on industrial processes. Prerequisites: *Math. 13;* Math. 14, Chem. 30 and 41. First semester.

Ch.E. 79. Chemical Engineering (3).

A continuation of Chem. 78. including heat generation and exchange. (Two hours lectures and three hours laboratory). Prerequisites: *Math. 14;* Chem. 6, 31, 45, and 150; Ch.E. 78. Deposit, $15.00. Second semester.

Ch.E. 80. Industrial and Engineering Chemistry (3).

Introduction to chemical engineering principles through a study of unit process operations in various chemical industries. Prerequisites: *Chem. 30 and 41;* Math. 14. Second semester.

For Advanced Undergraduates and Graduates

Chem. 169. Industrial Biochemistry Laboratory (1).

Laboratory work to accompany Chem. 171. Prerequisites: Chem. 150 and 165. Deposit, $15.00. First semester. Messrs. Theis, Serfass

Chem. 171. Industrial Biochemistry (3).

The inorganic, organic, and physical chemistry of life processes and their products. Atomic and molecular structure, equilibria, colloidal

state, catalysts, osmosis, synthesis, oxidation, and reduction as applying to carbohydrates, proteins, fats, lipoids, and their interrelations. This course may be taken without Chem. 169. Prerequisites: Chem. 150, 151, 165, and 166 or 167. First semester. Mr. Theis

Chem. 172. Industrial Biochemistry (3).

Continuation of Chem. 171 with special adaptations to tanning, foods, fermentation industries, sanitation, and sewage disposal. Second semester. Mr. Theis

Ch.E. 180. Chemical Engineering (3).

A continuation of Chem. 79, including phase change separation, design and cost data on unit processes and manufacturing plants. Visits to industrial plants in the Philadelphia area for inspection of large units are a part of the course. (Two hours lecture and three hours laboratory). Prerequisites: *Chem. 31, 45, and 150; Ch.E. 78.* Chem. 7, 9, and 151; Ch.E. 79. Deposit, $25.00. First semester. Mr. Simmons

Ch.E. 181. Chemical Engineering (3).

Continuation of Chem. 180. Visits to industrial plants in the New York area are a part of the course. Prerequisites: *Ch.E. 79 and M.E. 29;* Chem. 180, 190, and 193. Second semester. Mr. Simmons

Ch.E. 183. Unit Processes (3).

The chemical reactions, equipment and operating conditions of industrial processes involving alkylation, amination, diazotization, esterification, halogenation, hydrolysis, nitration, polymerization, sulfonation, etc. Prerequisites: *Chem. 150; Ch.E. 78* or Ch.E. 80; Chem. 151. First semester. Mr. Stoops

Ch.E. 185. Chemical Engineering Practice (1).

Comprehensive studies in nearby manufacturing plants of a few processes involving one or more unit engineering operations. These studies usually occupy time covering whole days or multiples thereof. Prerequisite: Ch.E. 180. Deposit, $10.00. Second semester. Mr. Simmons

For Graduates

Ch.E. 280. Industrial Chemistry and Chemical Engineering Research (4).

Investigation of a problem in chemical engineering or in industrial chemistry. Prerequisites: for problems in industrial chemistry, as in the statement above introductory to graduate courses; for investigation of a problem in chemical engineering, an undergraduate curriculum in chemical engineering substantially equivalent to the curriculum in this University. Deposit, $30.00. First semester. Messrs. Theis, Simmons, Stoops

Ch.E. 281. Industrial Chemistry and Chemical Engineering Research (4).

Continuation of Ch.E. 280. Deposit, $30.00. Second semester. Messrs. Theis, Simmons, Stoops

Ch.E. 282. Chemical Engineering (3).

Advanced consideration of chemical engineering energetics, hydrodynamics and heat transfer applied to filtration, classification, and extraction. Prerequisites: courses substantially equivalent to the undergraduate curriculum in this University. Given in alternate years. First semester.
Mr. Simmons

Ch.E. 283. Chemical Engineering (3).

Continuation and amplification of Ch.E. 282, as applied to evaporation, refrigeration, and crystallization. Given in alternate years. Second semester.
Mr. Simmons

Ch.E. 284. Chemical Engineering (3).

Continuation and amplification of Ch.E. 282 and 283, as applied to absorption and distillation. Given in alternate years. First semester.
Mr. Simmons

Ch.E. 285. Chemical Engineering (3).

Continuation and amplification of Ch.E. 282 and 283, as applied to combustion, drying, hygrometry, and air conditioning. Given in alternate years. Second semester.
Mr. Simmons

Ch.E. 288. Chemical Engineering Process Design (3).

The application of chemical engineering principles in the design of unit process equipment involving such processes as evaporation, distillation, drying, filtration, and absorption and the coordination of such units into organized production. Prerequisites: courses substantially equivalent to the undergraduate curriculum in chemical engineering in this University. Deposit, $30.00. First semester.
Messrs. Theis, Simmons

Ch.E. 289. Chemical Engineering Process Design (3).

Continuation of Ch.E. 288. Deposit, $30.00. Second semester.
Messrs. Theis, Simmons

CIVIL ENGINEERING

PROFESSOR SUTHERLAND
ASSOCIATE PROFESSORS S. A. BECKER, FULLER, ENEY, AND PAYROW
ASSISTANT PROFESSORS UHLER, AND IPPEN
MESSRS. MAINS, HESSEMER, AND SAVASTIO

C.E. 1. Engineering Drawing (2).

The use of drawing instruments; lettering and tracing; mechanical drawing of objects; simple projections; isometric drawings; principles of projection drawing. First semester.

C.E. 2. Engineering Drawing (2).

Continuation of C.E. 1. Working drawings; applications of projection drawing. Prerequisite: C.E. 1. Second semester.

C.E. 6. Land and Topographic Surveying (4).

The theory and practice of land surveying, including computation of areas, dividing land; map drawing and topographic signs; field work with level and transit; theory and use of stadia. Prerequisites: *plane trigonometry;* C.E. 1. Summer session: a recitation and seven hours of field work each week-day for four weeks. Not given during the war emergency.

C.E. 6a. Land and Topographic Surveying (3).

An abridgment of C.E. 6, given on the University campus during the war emergency. Prerequisites: *Plane Trigonometry;* C.E. 1. Summer and fall semesters.

C.E. 8. Mechanics of Materials (4).

The physical properties of structural materials; theory of beams, columns, and shafts. Prerequisites: *Math. 13;* Math. 14. First semester.

C.E. 9. Mechanics of Materials (3).

An abridgment of C.E. 8. Prerequisites: *Math. 13;* Math. 14. First and second semesters.

C.E. 10. Materials Testing Laboratory (1).

Experiments on wood, iron, and steel to determine the action of materials under stress and to study the physical properties of materials of construction. Prerequisites: *C.E. 8 or 9, previously or concurrently.* Fee, $5.00. First and second semesters.

C.E. 11. Railroad Engineering (3).

Theory of curves and turnouts; preparation of profiles and maps; the computation of earth work and estimates of cost; the construction and maintenance of road-bed and of drainage structures. Prerequisites: C.E. 6 Second semester.

C.E. 12. Hydraulics (3).

Hydrostatics and theoretical hydraulics; the flow of water through orfices, weirs, tubes, pipes, and channels; hydraulic motors. Prerequisites: *Math. 13;* Math. 14. Second semester.

C.E. 13. Hydraulics (2).

An abridgment of C.E. 12. Prerequisites: *Math. 13;* Math. 14. Second semester.

C.E. 14. Hydraulics Laboratory (1).

Experiments in the measurement of water and the testing of hydraulic machinery. Prerequisites: *C.E. 12 or 13, or Chem. 78, previously or concurrently.* Fee, $5.00. Second semester.

C.E. 15. Structural Theory: Stresses (4).

Algebraic and graphic determination of stresses in roof and bridge trusses under dead, live, and wind loads. Prerequisites: C.E. 8 or 9. Second semester.

C.E. 15a. Structural Theory: Stresses (3).

An abridgment of C.E. 15. Prerequisite: C.E. 8 or 9. Second semester.

C.E. 16. Highway Engineering (3).

The location, construction, and maintenance of roads and pavements; highway design. Prerequisite: C.E. 6. First semester.

C.E. 16a. Highway Engineering (2).

An abridgment of C.E. 16. Prerequisite: C.E. 6. First semester.

C.E. 19. Advanced Mechanics of Materials (3).

A continuation of C.E. 8. Stresses at a point, theories of failure, energy loads, dynamic stress effects, unsymmetrical bending, curved beams, torsional resistance of bars with non-circular cross-sections. Prerequisites: *Math. 14;* C.E. 8. Second semester.

C.E. 29. Industrial Employment.

During the summer following the junior year, students are required to spend at least eight weeks in shop work or on engineering construction, and are required to submit a written report.

C.E. 30. Structural Design (3).

Design of mine structures in steel and wood. An elective course for mining engineers. Prerequisite: C.E. 9. Second semester.

C.E. 31. Route Surveying (2).

Reconnaissance, preliminary, office, and field location methods; laying out curves, setting slope stakes; staking out drainage and other structures. One recitation and seven hours of field work each week-day for two weeks. Prerequisite: *C.E. 6;* C.E. 11. Summer session. Not given during the war emergency.

C.E. 31a. Route Surveying (3).

An extension of C.E. 31 given on the University campus during the war emergency. Prerequisites: *C.E. 6a,* C.E. 11. Spring and summer semesters.

C.E. 32. Mechanics of Materials (3).

A course somewhat more advanced in content than C.E. 9 with the inclusion of a number of tests of materials. Prerequisites: *M.E. 4; Math. 13;* Math. 14. Fee, $2.50. First and second semesters.

C.E. 33. Hydraulics (3).

Two recitation periods per week devoted to the more important principles of theoretical hydraulics with practical applications, and a laboratory period given to the study of the flow of water through pipes, orifices, and turbines. Prerequisites: *Math. 13;* Math. 14. Fee, $5.00. First semester.

C.E. 35. Advanced Surveying (3).

Adjustment of instruments; investigation of systematic and observational errors; elements of least squares with applications to surveying; adjustment of level nets and triangulation; solar and polar observations. Field work in triangulation, determination of azimuth, precise leveling, and with the plane table. Brief treatment of mine surveying and photogrammetry. Prerequisite: C.E. 6. First semester.

C.E. 40. Engineering Conference.

Required of seniors in the curriculum of civil engineering. Second semester.

C.E. 41. Civil Engineering Proseminar (2).

A study of current civil engineering projects and developments with written reports. At weekly meetings these reports are presented orally in abstract. Prerequisite: senior standing. Second semester.

C.E. 41a. Civil Engineering Proseminar (1).

An abridgment of C.E. 41. Prerequisite senior standing. Second semester.

C.E. 50. Thesis (3).

Thesis may be taken only by students of outstanding ability. Second semester.

For Advanced Undergraduates and Graduates

C.E. 100. Engineering Valuation and Economy (3).

The determination of probable life, earning power, and present worth of public and private industrial properties. Prerequisites: senior standing in engineering; Fin. 25; Acctg. 4 desirable either previously or concurrently. Second semester.

C.E. 101. Foundations (2).

Construction and design; elements of soil mechanics with applications to foundations. Prerequisites *C.E. 8 or 9;* Geol. 9. Second semester.

Mr. Fuller

C.E. 118. Structural Theory (3).

Study of the principles of design of structural members of wood and steel. Concurrent with C.E. 119. Prerequisite: *C.E. 8;* C.E. 15. First semester. Messrs. Eney and Uhler

C.E. 119. Structural Design (3).

Application of the principles studied in C.E. 118 to the design both of individual structural members and certain complete structures, principally a plate girder bridge, a steel building frame, and a truss bridge. Prerequisite: *concurrent with C.E. 118.* First semester.

Messrs. Eney and Uhler

C.E. 119a. Structural Design (1).

An abbreviation of C.E. 119. Prerequisite: *concurrent with C.E. 118.* First semester. Messrs. Eney and Uhler

C.E. 120. Structural Design (2).

Wood construction. Prerequisite: C.E. 118. Second semester. Mr. Eney

C.E. 124. Structural Theory (3).

An introduction to the study of stresses in indeterminate structures. Prerequisite: C.E. 15. Second semester. Mr. Sutherland

C.E. 125. Reinforced Concrete Design (3).

Theory of reinforced concrete; design of reinforced concrete buildings, bridges and retaining walls. Prerequisites: *C.E. 8 or 9;* C.E. 15. First semester. Mr. Sutherland

C.E. 126. Concrete Laboratory (1).

The manufacture, properties, and testing of cement, mortar, and concrete; tests on reinforced concrete beams and columns. Prerequisite: *C.E. 125.* Fee, $5.00. Second semester. Mr. Fuller

C.E. 128. Sanitary Engineering (3).

Fundamental principles of the design of water supply and sewerage systems and of water and sewage treatment plants. Prerequisites: C.E. 12 or 13, or Chem. 78. First semester. Mr. Payrow

C.E. 129. Sanitary Engineering Design (3).

Continuation of C.E. 128. Detailed design of water and sewage systems, including the complete design of a water and a sewage treatment plant. Prerequisite: C.E. 128. Second semester. Mr. Payrow

C.E. 130. Sanitary Engineering Laboratory (1).

Laboratory tests of water and sewage as applied to the operation of water and sewage plants. Visits of inspection are made to nearby water and sewage treatment plants. Prerequisite: C.E. 128. Second semester. Mr. Payrow

C.E. 131. Advanced Sanitary Engineering (3).

Engineering and public health; consideration of such matters as garbage and refuse collection and disposal, street cleaning methods, air conditioning, insect-borne diseases, rural sanitation, public health administration. Prerequisites: C.E. 128. Second semester. Mr. Payrow

C.E. 132. Advanced Highway Engineering (3).

Continuation of C.E. 16. A study of soil mechanics as related to subgrade conditions and the stability of earth slopes. Prerequisites: *C.E. 16;* C.E. 8 and 12. Second semester. Mr. Becker

C.E. 135. Structural Welding (1).

The design of welded steel structures together with a study of current literature. A few periods will be devoted to the manual operation of

making welds. Prerequisite: senior standing in civil or mechanical engineering. Second semester.

For Graduates

The following courses are open to engineering graduates only. The prerequisite for any course listed is the undergraduate course of similar title. Math. 217 and 218, Theory of Elasticity, may be included in a graduate major as though given in the department of civil engineering.

C.E. 201. Advanced Structural Theory (3).

The design and investigation of statistically indeterminate structures of steel and reinforced concrete, including arches. First semester. Mr. Sutherland

C.E. 202. Advanced Structural Theory (3).

Continuation of C.E. 201. Second semester. Mr. Sutherland

C.E. 203. Plain and Reinforced Concrete (3).

A critical review of recent research. Correlation of research with analysis and design. Given in alternate years. First semester.

C.E. 206. Special Methods of Analysis (3).

Analysis of complex stress distributions by the photoelastic and other methods. Prerequisite: C.E. 212. Given in alternate years. Second semester.

C.E. 207. Sanitary and Hydraulic Engineering (3).

The design of reservoirs, tanks, and pipe lines for water supply systems, and of sewers and other appurtenances for sewage systems. Inspection of existing plants, with reports thereon. First semester. Mr. Payrow

C.E. 208. Sanitary and Hydraulic Engineering (3).

Continuation of C.E. 207. Second semester. Mr. Payrow

C.E. 209. Structural Seminar (3).

Study of current discussion in the field of structural theory and design. First semester. Messrs. Sutherland, Ippen

C.E. 210. Structural Seminar (3).

Continuation of C.E. 209. Second semester. Messrs. Sutherland, Ippen

C.E. 212. Research Methods (3).

Study of principles of research as applied to engineering materials; measuring instruments, testing machines. First semester.

C.E. 213. Structural Research (2 to 5).

Individual research problems with reports. First or second semester.

C.E. 214. Mechanical Methods of Stress Determination (3).

Use of mechanical devices in investigation of special problems such as temperature deformations, foundation displacements and integral action

of structures; theory of similitude. Given in alternate years. Second semester. Mr. Eney

C.E. 215. Structural Members and Frames (3).

Analysis and design problems in bending and elastic stability. Given in alternate years. Not given in 1942-43. First semester.

C.E. 216. Plate and Shell Structures (3).

Analysis and design problems in bending and elastic stability. Given in alternate years. Not given in 1942-43. Second semester.

C.E. 217. Foundation Engineering (3).

Physical properties of soils; soil testing for foundation purposes, applications to theory and design. First or second semester. Mr. Becker

C.E. 219. Structural Welding (3).

Continuous and non-continuous construction with welded connections; distortion effects; current research. Given in alternate years. Second semester.

C.E. 231. Hydrodynamics (3).

Fundamentals of fluid motion; flow phenomena in closed and open channel; advanced practical problems. First semester. Mr. Ippen

C.E. 232. Run-off and Stream-Flow (2).

Hydrologic studies. Soil conservation, flood prevention and control, hydraulic structures. First semester. Mr. Ippen

C.E. 233. Hydraulic Laboratory Practice (2).

Study of theory and methods of hydraulic experimentation simultaneously with laboratory work. Second semester. Mr. Ippen

C.E. 235. Hydraulic Research (2 to 5).

Individual research problems with reports. First and second semesters. Mr. Ippen

ECONOMIC STATISTICS

See Accounting

ECONOMICS AND SOCIOLOGY

PROFESSOR DIAMOND
DEAN CAROTHERS

ECONOMICS

Eco. 1. Industrial Evolution (3).

An introductory course outlining the gradual development of economic organization with special attention to the stages of economic progress and social institutions growing out of these stages. First semester.

Eco. 3. Economics (3).

A general course in the principles of economics, covering the fundamental forces governing the production, distribution, and consumption of wealth, with emphasis on value, exchange, money, rent, interest, profits, and wages. Prerequisite: sophomore standing. First semester.

Eco. 4. Economics (3).

Continuation of Eco. 3. Prerequisite: Eco. 3. Second semester.

Eco. 11. Marketing (3).

A detailed and critical analysis of the principles of marketing. Designed to acquaint the student with major institutions and functions involved in the distribution of goods and services from the producer to the consumer. Primary prerequisite: Eco. 4. First semester.

Eco. 15. Retailing (3).

A study of modern retail institutions. Principles and methods of retail organization and management. Economic, social, and legislative aspects of the retailing structure. Primary prerequisite: Eco. 4. Secondary prerequisite: Eco. 11. Second semester.

Eco. 50. Economic Geography (3).

A survey of world resources and world trade, with special reference to the chief economic materials and the geographic and economic factors responsible for the position of the United States in the economic world. Second semester.

Eco. 60. Insurance (3).

A non-mathematical course in the economic principles and business practice of insurance, particularly life, fire, and casualty insurance. Prerequisite: Eco. 4. First semester.

For Advanced Undergraduates and Graduates

Eco. 107. Advanced Economics (3).

An advanced course in the principles of economics, dealing especially with the theory of the distribution of wealth, the nature of the productive process, the history of economic doctrines, and proposed plans of economic reform such as socialism. Prerequisite: *Eco. 4.* First semester.

Mr. Diamond

Eco. 108. Advanced Economics (3).

Continuation of Eco. 107. Prerequisite: *Eco. 4.* Second semester.

Mr. Diamond

Eco. 113. Advertising (3).

The principles, practices, and problems of advertising with special reference to its social and economic aspects. Prerequisite: *Eco. 4;* Eco. 11. First semester.

Eco. 114. Selling and Sales Management (3).

The principles and practices of modern selling and sales management. The function of distribution in modern management. Prerequisite: *Eco. 4;* Eco. 11. Second semester.

Eco. 133. Labor Problems (3).

The economics of labor, the history of labor movements in the United States, forms of labor organizations, and the method and policies of trade unions. Prerequisite: *Eco. 4.* First semester. Mr. Diamond

Eco. 134. Labor Problems (3).

A continuation of Eco. 133. The relations of labor to the courts; social legislation. Unemployment, employee health, accidents, personnel work, and employee representation. Prerequisite: *Eco. 4;* Eco. 133. Second semester. Mr. Diamond

Eco. 171. Readings in Economics (3).

Readings in various fields of economics, designed for the student who has a special interest in some field of economics not covered by the regularly rostered courses. Prerequisites: senior standing and consent of the head of the department. First semester. Mr. Diamond

Eco. 172. Readings in Economics (3).

Continuation of Eco. 171. Prerequisites: senior standing and consent of the head of the department. Second semester. Mr. Diamond

SOCIOLOGY

Soc. 51. Social Institutions (3).

A one-semester course outlining the fundamental institutions of the social order, with special reference to their origin, growth, and present interrelations. Prerequisite: *Eco. 4.* First semester.

For Advanced Undergraduates and Graduates

Soc. 161. Sociology (3).

The nature and the growth of social institutions, with emphasis on evolution, racial developments, social stratification, and the social problems connected with the institutions of private property, family organization, and sex. Prerequisite: *Eco. 4.* First semester. Mr. Diamond

Soc. 162. Social Problems (3).

Special problems of contemporary society, including population trends, crime, public health, poverty, child welfare, the handicapped, etc. Prerequisite: *Eco. 4.* Second semester. Mr. Diamond

Soc. 171. Readings in Sociology (3).

Readings in various fields of sociology, designed for the student who has a special interest in some field of sociology not covered by the regularly rostered courses. Prerequisites: senior standing and consent of the head of the department. First semester. Mr. Diamond

Soc. 172. Readings in Sociology (3).

Continuation of Soc. 171. Prerequisite: senior standing and consent of the head of the department. Second semester. Mr. Diamond

EDUCATION

ASSISTANT PROFESSOR LEE
PROFESSOR CONGDON
ASSOCIATE PROFESSORS F. C. BECKER, AND LARAMY
MR. HAYWARD

Attention is also called to the statement concerning preparation for teaching in the description of the College of Arts and Science.

Educ. 0. Effective Study Methods.

A practical course in study techniques and in the tools of study, including reading and fundamentals of mathematics, as the needs of individual students may require. An extensive testing program is carried on to assist the student in adjusting himself. Prerequisite: *consent of the instructor.* Not given in 1944-45. Second half of first semester. No credit toward graduation.

Educ. A. Effective Study Methods (3).

A continuation of Educ. 0. Prerequisite: Educ. 0. Not given in 1944-45. Second semester.

Educ. 1. Introduction to Education (3).

A general introduction to the field of education, giving a broad survey of the work of the teacher and of the public schools. Required for the college provisional certificate. Should be taken during the junior year or earlier. First and second semesters.

Educ. 20. Educational Psychology (3).

An introductory course furnishing a psychological foundation immediately related to educational problems and practice. Practical problems involving analysis of designated material are assigned regularly for solution and report. Required for the college provisional certificate. Should be taken during the junior year. Prerequisite: *Psych. 1.* Second semester.

Educ. 51. Principles of High School Teaching (3).

Basic methods of secondary instruction, including the objectives of education in relation to the curriculum; socialized procedure; problem-project method; contract plans; types of teaching related to different fields; directed study; organization of courses around criticized objectives and the conduct of classes along the lines of individualized instruction. Recommended for the college provisional certificate. Should be taken with Educ. 53. Prerequisites: Educ. 1 and 20. First semester.

Educ. 53. Observation of Secondary School Teaching (3).

Study, directed observation, and discussion of the various phases of teaching activity in high schools in or near Bethlehem. The class meets two hours each week. In addition, detailed reports are required for sixty observation periods. Required for the college provisional certificate. Prerequisites: Educ. 1 and 20; Educ. 51 concurrently. Not given in 1944-45. First semester.

Educ. 54. Practice Teaching of Secondary School Subjects (3).

An intensive practical application of the principles of teaching to classroom conditions. The class meets two hours each week, in sections according to major interests, for the study of teaching procedure, actual organization, and planning of courses around definite objectives. A minimum of sixty periods of acceptable supervised practice in classroom instruction is required. Students must have at least one free hour at the same time each day throughout the week. Required for college provisional certificate. Prerequisite: *Educ. 53 and fifteen semester hours in each subject the candidate expects to teach.* Not given in 1944-45. Second semester.

Educ. 56. Practice Teaching of Secondary School Subjects (3).

A continuation of Educ. 54 required of students who desire certification in New Jersey. Teaching must be done in a field for which practice teaching credit has not previously been granted. Prerequisite: *Educ. 53 and fifteen semester hours in the subject the candidate expects to teach.* Educ. 54 may be taken concurrently. Not given in 1944-45. Second semester.

For Advanced Undergraduates and Graduates

Educ. 121. The Diagnosis and Adjustment of Reading Difficulties (3).

The psychology of reading as related to learning difficulties. The fundamental skills of reading, including eye movements, the measurement and diagnosis of reading difficulties, and recent experiments with remedial procedure. Practice in the development of material for remedial instruction. Prerequisite: *consent of the instructor.* First or second semester.

Mr. Hayward

Educ. 130. History of Education in Europe (3).

A survey of the Greek, Roman, and early Christian periods; late medieval and early modern periods; European movements since the French Revolution and their implications for American education. Second semester.

Mr. Becker

Educ. 131. History of Education in the United States (3).

The development of primary, secondary, and higher education in the United States. The aims, curricula, methods, and systems of education, through five periods from Colonial times to the present, in relation to the social conditions and processes. Prerequisite: junior standing. First semester.

Mr. Becker

Educ. 150. Principles of Secondary Education (3).

The aims, organizations, and materials of secondary education, characteristics of secondary school pupils, and a general treatment of the problems of secondary education. An introductory course in the field of secondary education. Recommended for the college provisional certificate. Prerequisite: consent of the instructor. Second semester.

Mr. Congdon

Educ. 151. Organization of Materials of Instruction (3).

A practical course for the teacher in service offering opportunity for cooperative planning of courses and units of instruction. Applying the principles of curriculum construction to the selecting, assembling, and organizing of materials of instruction. The teacher is expected to work in his field of special interest. Prerequisite: *consent of the instructor.* First semester.

Educ. 171. Elementary Educational Statistics (3).

Designed to give teachers and administrative officers the techniques necessary to enable them to gather data and present the results of their work in their classrooms and schools. Provides a practical knowledge of the simpler statistical methods for use in handling common problems and in understanding educational literature. Prerequisite: *consent of the instructor.* First semester.

Educ. 173. Diagnostic and Remedial Teaching (3).

The analysis and treatment of difficulties in the various subjects. The student may select any academic subject, in which he has adequate background, as his field of work. Practice is given in the development of materials, and actual work with failing pupils is expected. Prerequisite: *consent of the instructor.* Summer session. Mr. Hayward

Educ. 190. Visual Instruction (3).

Types of visual aids, the special value of each, their use in different subjects, the psychological basis for the use of such material and the standards for the selection of visual sensory aids. Required for the permanent college certificate. May be completed as an undergraduate course or may be completed after graduation before application is made for the permanent college certificate. Second semester. Mr. Lee

For courses in special methods, see Lat. 109 and 110, in the department of Latin.

For Graduates

The major in education on the graduate level is intended for students preparing for school administration and supervision and for other types of public school positions. Preparation is offered for such positions as Superintendent of Schools, Supervising Principal, Elementary Principal, Secondary Principal, and Vocational Counsellor. All work is approved by the State Councils of Education of Pennsylvania and New Jersey.

At least four semester courses in education are prerequisite for a graduate major in this field. The prerequisites may be taken concurrently with a partial major program. Attention is called to Educ. 121, 130, 131, 150, 151, 171, 173, and 190, all of which are

open to advanced undergraduates and graduate students, and which may be accepted toward a major or as collateral work in education.

Educ. 219. Social Policy and Education (3).

A critique of the aims of education in the modern social order. The nature, needs, and adjustments of modern industrial society; the conflicting demands upon education by a changing civilization as represented by modern social points of view; the implications, for education, of contemporary American philosophy of democratic social progress. Prerequisite: *consent of the instructor.* First semester. Mr. Congdon

Educ. 220. Advanced Educational Psychology (3).

Study and practice of techniques and methods involved in making a detailed psychological analysis of the pupil, particularly in relation to school problems. Prerequisite: consent of the instructor. Not given in 1944-45. Second semester.

Educ. 222. Education of Exceptional Children (3).

Methods of instruction and provision of materials for children who differ markedly from the normal, i.e., gifted, subnormal, and maladjusted. The problems of the teacher in a system that makes little provision for the exceptional child. Actual case studies of pupils are required. Prerequisite: consent of the instructor. Second semester.

Educ. 223. Psychology of School Subjects (3).

An analysis of the psychological development and behavior of pupils in connection with school subjects at all levels. Diagnostic work. Each student has an opportunity to emphasize the subject of his special interest. Summer session. Mr. Hayward

Educ. 243. Elementary School Administration (3).

The major problems of organization and administration of elementary schools. Types of organization, pupil promotion, time allotment, service agencies, and plant and equipment. Required for a principal's certificate. Second semester. Mr. Lee

Educ. 244. The Elementary School Curriculum (3).

Problems of curriculum development in the first six grades; subject matter placement, program making for different types of schools, regular vs. special subjects, articulation, and similar problems. First semester. Mr. Lee

Educ. 246. Elementary School Supervision (3).

Methods, materials, organization, and evaluation of supervision. Each student will be required to develop a supervisory program for a subject or a school. Second semester. Mr. Lee

Educ. 253. Secondary School Administration (3).

The major problems of organization and administration of secondary schools: program of studies, teaching staff, pupil personnel, plant and

equipment, and community relationships. Required for a principal's certificate. Prerequisite: *Educ. 150 or its equivalent.* First semester.

Educ. 254. The Secondary School Curriculum (3).

Related to Educ. 253, but organized in such a way that it may be taken independently. Methods of study of curriculum problems, the selection of subject matter in various fields, the principles of program construction, and similar problems. Prerequisite: *Educ. 150 or its equivalent.* Second semester.

Educ. 256. Supervision in Secondary Schools (3).

Related to Educ. 253 and 254, but may be taken independently. The purpose of supervision, a program for the improvement of teaching, the evaluation of teaching, measurement, supervisory relationships, and similar problems involved in the supervision of instruction in secondary schools. Prerequisite: *Educ. 150 or its equivalent.* Second semester.

Educ. 257. Modern Trends in Teaching (3).

Designed for the teacher in service and for principals who wish a knowledge of the most recent developments in the trends and techniques of teaching. Special attention is given to experimental studies in the field of method. Prerequisite: *consent of the instructor.* First semester. Mr. Lee

Educ. 263. Public School Administration (3).

A systematic treatment of the problems of administration, local, state, and national. The newer developments which are modifying educational administration: state authorization and organization, the board of education, the superintendent of schools, personnel management, business administration, financial support, and public relations. First semester.

Messrs. Congdon, Lee, Laramy

Educ. 264. Foundations of Curriculum Construction (3).

Principles of curriculum construction which underlie the reorganization of the program of studies for elementary and secondary schools. Consideration of the origin and background of the curriculum, methods of organization, state, county, and city programs, curriculum planning and development, techniques for developing materials, and similar pertinent topics. First semester. Mr. Lee

Educ. 266. Supervision of Instruction (3).

Analysis of the principles underlying the organization and supervision of instruction. Applications to specific teaching situations. No lines will be drawn between the elementary and the secondary school. Summer session. Messrs. Lee, Hayward

Educ. 272. Educational Tests and Measurements (3).

Selection of educational tests, organization of a testing program, use of tests in classification, construction of classroom tests, use of tests in improving teaching, and diagnosis of pupil difficulties. For advanced work in this field attention is called to the seminar and individual research courses. Not given in 1943-44. Second semester. Mr. Lee

Educ. 282. Educational and Vocational Guidance (3).

General principles of guidance. Discovery of interests and abilities, study of occupations, study of educational opportunities, guidance activities, group programs, student personnel problems. Current practices are carefully examined. Required for guidance certificates. For advanced work in this field attention is called to the seminar and individual research courses. Second semester.

Educ. 291-292. Seminars (3).

One seminar is organized in each half year provided three or more students select such work. These courses do not duplicate the courses of individual research. It is the purpose of seminar courses to provide for cooperative study of special problems in the field of elementary and secondary education. Prerequisite: *consent of the instructor.* First and second semesters. Messrs. Congdon, Lee, Hayward

Educ. 293-294. Individual Instruction, Field Work, or Research (3).

Open to students with appropriate preparation and needs for pursuing independent investigation. The student must have shown interest and capacity for advanced work in the chosen field evidenced in part by an approved plan of work. Prerequisite: *consent of the instructor.* First and second semesters. Messrs. Congdon, Lee, Hayward

Educ. 295-296. Seminar in School Administration (3).

Cooperative study of special problems in the field of school administration. Appropriate problems include: finance, building programs, business management, and school law. Prerequisite: *consent of the instructor.* First and second semesters. Messrs. Congdon, Lee, Laramy

ELECTRICAL ENGINEERING

PROFESSOR BEAVER
ASSOCIATE PROFESSORS A. R. MILLER AND BRENNECKE
ASSISTANT PROFESSORS GRUBER, MODE AND FISCHER

E.E. 23. Thesis for Degree of B.S. in Electrical Engineering (3).

Independent work in theory, experimental research, or designing, with frequent reports of progress, supplemented by reference reading. The subject of the thesis is to be chosen in the first semester though the work upon which it is based may be done in either semester. Prerequisite: senior standing. First or second semester.

E.E. 32. Direct Current Machinery (4).

Direct current circuits; magnetic circuits; direct current machine construction, operation, and control; generated voltages, forces on conductors, armature windings, machine characteristics. Prerequisites: *Phys. 24, Math. 13;* Math. 14 concurrently. Second semester.

E.E. 33. Direct Current Laboratory (2).

A coordinated laboratory course supplementing the classroom work in E.E. 32. Experimental studies and tests of direct-current machines and appliances, including characteristics, regulations, efficiency, etc. Fee, $6.00. Prerequisite: *E.E. 32, concurrently.* Second semester.

E.E. 34. Alternating Current Circuits (3).

Alternating current conceptions; laws for series and parallel circuits containing R, L, and C; vector methods; complex quantities; single and polyphase circuits and networks; power; Fourier Series; harmonics; superposition. Prerequisites: *E.E. 32 or E.E. 50, Math. 14;* Math. 106 concurrently. First semester.

E.E. 35. Alternating Current Circuits Laboratory (1).

Supplements E.E. 34. Alternating current circuit experiments, with oscillographic studies. Fee, $6.00. Prerequisite: *E.E. 34 concurrently.* First semester.

E.E. 36. Alternating Current Machines (3).

The electrical, magnetic, and mechanical features of single and polyphase transformers and induction motors. Prerequisites: *E.E. 34,* E.E. 37 concurrently. Second semester.

E.E. 37. Alternating Current Machine Laboratory (2).

Supplements E.E. 36. Laboratory tests on transformers, transformer banks and induction motors. Fee, $12.00. Prerequisite: *E.E. 36 concurrently.* Second semester.

E.E. 38. Alternating Current Machines (3).

A continuation of E.E. 36. Treats the electrical, magnetic, and mechanical features of synchronous generators, motors, and converters. Parallel operation. Prerequisites: *E.E. 36;* E.E. 39 concurrently. First semester.

E.E. 39. Alternating Current Machine Laboratory (2).

A continuation of E.E. 37, supplementing E.E. 38. Laboratory tests on synchronous generators, motors, and converters. Measurement of constants, parallel operation, calculations. Fee, $12.00. Prerequisite: *E.E. 38 concurrently.* First semester.

E.E. 40. Electronic Devices (3).

A study of the fundamentals of electronic discharges in vacua and gases, operating characteristics of vacuum and gaseous tubes, mercury arc rectifiers, photoelectric cells, cathode ray oscillographs, etc.; emphasis on application of electronic devices in industry. Prerequisite: *E.E. 34.* Second semester.

E.E. 50. Dynamos and Motors, General (2).

The principles and practice of direct-current engineering, including the elementary theory, construction, operation, and control of direct-current generators and motors, electromagnets, solenoids; illustrative problems. A one-semester course designed for non-electrical engineers. Prerequisites: *Math. 13, Phys. 24.* First and second semesters.

E.E. 51. Dynamo Laboratory, Beginning (1).

Introductory course supplementing the class work of E.E. 50. Experimental studies and tests of direct-current generators and motors for characteristics, regulations, efficiency, etc. Prerequisite: *E.E. 50 concurrently.* Fee, $6.00. First and second semesters.

E.E. 52. Alternating Currents, General (2).

Continuation of E.E. 50; the principles and practice of alternating-current engineering; the theory of alternating currents with applications to alternating-current generators, motors, transformers, and other apparatus; systems of transmission and distribution. Prerequisite: E.E. 50. First and second semesters.

E.E. 53. Dynamo Laboratory, Intermediate (1).

Continuation of E.E. 51, supplementing the class work of E.E. 52 and 54. Advanced testing of direct-current machines; practice in operating and testing alternating-current apparatus. Prerequisites *E.E. 51; E.E. 52 concurrently.* Fee, $6.00. First and second semesters.

E.E. 54. Electrical Engineering, Applications (2).

Systems of generation, transmission, distribution, and utilization taken up in order, under utilization special attention given to the application of electric motors to various industries; estimates and costs; problems. Particularly adapted to students who do not specialize further along electrical lines. Prerequisites: *E.E. 50; E.E. 52 concurrently.* Second semester.

E.E. 55. Dynamo Laboratory, Advanced (1).

Continuation of E.E. 53, consisting of advanced direct- and alternating-current studies and tests. Primarily for non-electrical students taking more than the usual two semesters of dynamo laboratory. Prerequisites: *E.E. 53, E.E. 54 concurrently.* Fee, $6.00. Second semester.

E.E. 58. Electrical Machinery (3).

A short course covering the theory and application of direct- and alternating-current apparatus adapted to students requiring a minimum of electrical engineering, including: direct-current and alternating-current circuit theory, construction and operation of electrical machinery. Prerequisites: *Math, 13, Phys. 24 concurrently.* First or second semester.

E.E. 59. Dynamo Laboratory, Combined (1).

A brief course covering the simpler tests on direct- and alternating-current circuits and apparatus. Prerequisite: *E.E. 58 previously or concurrently.* Fee, $6.00. First or second semester.

For Advanced Undergraduates and Graduates

E.E. 101. Electric Power Stations (3).

Hydro stations; steam stations; prime movers; auxiliary equipment; bus systems; cables; switch gear; circuit breakers; switchboards; measuring and protective devices; layout and design; operation and management; plant economics and rate making; visits to neighboring plants. Prerequisites: *E.E. 38 concurrently.* First semester. Mr. Beaver

E.E. 102. Distribution Systems (3).

Substations; D.C. and A.C. networks; residential and industrial power distribution; relays; protective devices; short-circuit calculations; economics of distribution. Prerequisite: *E.E. 101.* Second semester. Mr. Beaver

E.E. 103. Industrial Applications (3).

Motor characteristics; load characteristics; control devices; conversion apparatus; power factor correction; the principles of motor application, with specific examples; application of electronic devices; electric transportation. Prerequisite: *E.S. 38 concurrently.* First semester. Mr. Brennecke

E.E. 106. Illumination Engineering (3).

A study of the principles involved in the production and utilization of light from artificial sources. The spectroradiometric curve; the visibility function; photometric methods, units, and standards; incandescent, gaseous-conduction, and fluorescent sources; design of indoor and outdoor lighting installations. Prerequisites: *E.E. 34, E.E. 50 or E.E. 58.* Second semester. Mr. Brennecke

E.E. 117. Electrical Engineering Proseminar (1).

A weekly meeting for discussion of topics from the current journals of theoretical and applied electricity. Presentation of papers on assigned topics. Prequisites: *E.E. 36, E.E. 37;* senior standing. First semester.

E.E. 118. Electrical Engineering Proseminar (1).

Continuation of E.E. 117. Prerequisite: *E.E. 117.* Second semester.

E.E. 131. Electric and Magnetic Fields (3).

The calculation and construction of electric and magnetic fields for conductors, plates, vacuum tubes, slots, teeth, etc.; analogous problems in fluid flow. The methods of the theory of functions of a complex variable and of Fourier series and integrals are introduced in sufficient detail to serve in the analytical work; the rules for free hand plotting are derived and applied. Prerequisites: *Math. 106;* E.E. 38 concurrently. First semester. Mr. Mode

E.E. 132. Electric Transients (3).

Electrical, mechanical, and heat flow transients of circuits, transmission lines, electrical machinery, and power systems. Operational calculus, to include Fourier integral, Bromwich integral. Laplacian transform, and the direct operational method. Prerequisites: *Math. 106;* E.E. 131. Second semester. Mr. Mode

E.E. 133. Transmission Lines (3).

Long distance transmission of power; determination of line constants; geometric mean distances; corona; interference; differential equations and solutions; general circuit constants; regulation; losses and efficiency; mechanical design of lines; economics of power transmission. Prerequisites: *Math. 106, E.E. 38 concurrently.* First semester. Mr. Miller

E.E. 134. Transmission Line Transients (3).

Traveling waves; free and forced oscillations; reflections; transition points; multi-conductor systems; multi-velocity waves; attenuation and distortion; lightning surges; switching surges; arcing grounds; protective devices. Surges in transformer and machine windings. Prerequisites: *E.E. 133, E.E. 132 concurrently.* Second semester. Mr. Miller

E.E. 135. Symmetrical Components (3).

The solution of unbalanced polyphase circuits by means of symmetrical components; system faults, open-circuit and short-circuit current and voltage calculations; sequence impedances of transmission lines, transformer banks, etc.; metering. Prerequisites: *E.E. 38 concurrently, E.E. 39 concurrently.* First semester. Mr. Miller

E.E. 136. System Stability (2).

Steady state and transient power limits of transmission systems. Electromechanical characteristics of electrical machines and networks. Prerequisites: *E.E. 135, E.E. 137 and E.E. 138 concurrently.* Second semester. Mr. Miller

E.E. 137. Advanced Machine Theory (3).

The transient theory of A-C machines. Balanced and unbalanced conditions; time constants. Approximate and rigorous solutions. Prerequisites: *E.E. 135, E.E. 132 and E.E. 138 concurrently.* Second semester. Mr. Miller

E.E. 138. Transients Laboratory (1).

An oscillographic laboratory study of transmission line transients, system stability, and machine transients. Prerequisites: *E.E. 134 concurrently, E.E. 136 concurrently, E.E. 137 concurrently.* Fee, $6.00. Second semester. Mr. Mode

E.E. 141. Radio Communication (3).

The principles of radio communication. A study of high frequency alternating currents, resonant circuits, and amplifier circuits. Laboratory measurements on audio and radio circuits. Prerequisite: *E.E. 40.* Fee, $6.00. First semester. Mr. Fischer

E.E. 142. Radio Communication (2).

Continuation of E.E. 141. A study of detection, oscillation, amplitude and frequency modulation, and television. Prerequisite: *E.E. 141.* Second semester. Mr. Fischer

E.E. 143. Wire Communication (3).

Introductory theory of networks. Bridge and coupled circuits; impedance matching; telephone circuits; transmission lines at audio and carrier frequencies. Communication apparatus. Prerequisite: *E.E. 40.* First semester. Mr. Brennecke

E.E. 144. Wire Communication (3).

Continuation of E.E. 143. Wave filters, repeaters, corrective and balancing networks. Electro-acoustics. Laboratory measurements on wire communication circuits. Fee, $6.00. Prerequisite: *E.E. 143.* Second semester. Mr. Brennecke

E.E. 146. Ultra-High-Frequency Techniques (4).

Power rectification, amplification, oscillation, cathode-ray tubes and circuits, modulation, demodulation, receivers, transmitters, ultra-high-frequency generators, radio frequency transmission lines, radiation, propagation and wave guides. One laboratory and three class periods per week. Prerequisites: *E.E. 141, E.E. 143.* Fee, $6.00. Second semester. Mr. Fischer

For Graduates

For graduate students intending to take their major subjects in electrical engineering, a preparation equivalent to the work required for the B.S. in E.E. degree is necessary.

Graduate courses are given to qualified men from the industries of the surrounding district.

E.E. 203. Electrical Design (3).

Predetermination by calculation of the characteristics, regulation, and performance of electrical machinery. Analysis and use of design constants. Design of special machines. First semester. Mr. Beaver

E.E. 204. Electrical Design (3).

Continuation of E.E. 203. Second semester. Mr. Beaver

E.E. 215. Gaseous Conductors.

A study of the electric and kinetic theory of gases including mean free paths, ionization, recombination, diffusion, scattering, mobility and space potential distributions. The theory of the spark, glow, and arc. First semester. Mr. Fischer

E.E. 216. Gaseous Conductors.

Continuation of E.E. 215 correlated with industrial problems. Second semester. Mr. Fischer

E.E. 217. The Economics of Electric Power (3).

A treatment of economic principles as applied to the design, selection, and use of electrical apparatus, plants, and systems; the adjustment of fixed charges and operating expenses by the application of Kelvin's Law to problems of generation, transmission, conversion, distribution, and utilization of electric power. First semester. Mr. Beaver

E.E. 218. The Economics of Electric Power (3).

Continuation of E.E. 217. Second semester. Mr. Beaver

E.E. 219. Theory of Networks (3).

Consideration of electrical networks from a general standpoint. Characteristics of two and four terminal networks. Foster's, Cauer's and Bartlett's theorems. Transformations by matrix manipulation. Theory of long lines. First semester. Mr. Brennecke

E.E. 220. Theory of Networks (3).

Continuation of E.E. 219. Advanced theory of wave filters. Simulative and corrective networks. Transient behavior of long lines and filters. Second semester. Mr. Brennecke

E.E. 221. Electro-Acoustics (3).

The principles and apparatus involved in the generation, transmission, and reproduction of sound by electrical means; a study of acoustical lines and filters, acoustical measurements, sound re-enforcing systems, supersonics. Prerequisite: E.E. 142 or its equivalent. First semester.
Mr. Brennecke

E.E. 222. Electro-Acoustics (3).

Continuation of E.E. 221. Second semester. Mr. Fischer

ENGLISH

PROFESSORS SMITH AND SEVERS
ASSOCIATE PROFESSORS RILEY AND CLIFFORD
ASSISTANT PROFESSORS CALLAGHAN, STRAUCH, AND CHRISTENSEN
MESSRS. RIGHTS, JONES, AND EHRSAM

The freshmen are distributed, upon the basis of preliminary tests given during freshman week, into three groups: low, Engl. 0; middle, Engl. 1; high, Engl. 3a.

Engl. 1 and 2 constitute the minimum freshman requirement. Since no college credit is given for Engl. 0, students in the low group are required to take Engl. 2 either in summer session or during the second year, in order to complete the six required hours. A student whose work shows that he has been placed in the wrong group may be transferred to the higher or to the lower group at any time during the year, if his instructor recommends and the head of the department approves the transfer.

Engl. 0. Elementary Composition (0).

Drill in fundamentals of English grammar and in the mechanics of writing. First and second semesters.

Engl. 1. Composition and Literature (3).

A rapid review of functional grammar and of sentence and paragraph structure. Practice in outlining and original composition. Readings in expository prose. First and second semesters.

Engl. 2. Composition and Literature (3).

Continuation of Engl. 1. Practice in expository writing, including documental papers and reports. First and second semesters.

Engl. 3a. Types of World Literature (3).

A study of the masterpieces of world literature. Written and oral reports. Required of freshmen in the high group. First semester.

Engl. 3b. Types of World Literature (3).

Continuation of Engl. 3a. Second semester.

ENGLISH LITERATURE AND COMPOSITION

Students wishing to major in English literature should take as preliminary work either Engl. 3a, 3b, or 4, 5, 8, 9, or such equivalent courses as may be recommended by the head of the department. They should then elect two English courses in each semester of the junior year and at least two in each semester of the senior year. Students working for honors take a seminar course in which they prepare a thesis as part of the honors requirement.

Engl. 4. A Study of the Drama (3).

Reading and critical study of types of drama; theories of the drama; the drama and the stage; the drama as a criticism of life. Prerequisites: Engl. 1 and 2. First semester.

Engl. 5. A Study of the Drama (3).

Continuation of Engl. 4. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 8. English Literature (3).

A survey of English literature from *Beowulf* through the Pre-romantics, with selected readings. Prerequisites: Engl. 1 and 2. First semester.

Engl. 9. English Literature (3).

A survey of English literature from Wordsworth to Housman. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 18. The Novel (3).

A study of the types of the novel. Reading and reports. Lectures on the history of the novel in England and America. Prerequisites: Engl. 1 and 2. First semester.

Engl. 19. The Novel (3).

Continuation of Engl. 18. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 20. American Literature, 1607-1855 (3).

A survey of the major writers from the settlement of America to the Civil War, including Franklin, Paine, Bryant, Emerson, Thoreau, Longfellow, Whittier, Poe, Holmes, Lowell, Irving, and Melville. Lectures and class discussions. Prerequisites: Engl. 1 and 2. First semester.

Engl. 21. Modern American Literature (3).

A study of the development of American literature from Whitman to the present day. Lectures and class discussions. Prerequisites: Engl. 1 and 2. Second semester.

Engl.41 Business Letters (3).

Rhetorical and psychological principles and forms in modern business communication. Practice in writing letters of inquiry, request, reply, acknowledgement, adjustment, credit, collection, sales and application. Prerequisites: Engl. 1 and 2. First and second semesters.

Engl. 42. Technical Writing (3).

Study and practice in forms and methods of technical exposition, description, definition, classification; the technical report, abstract, editorial, and book review; the semipopular article. Prerequisites: Engl. 1 and 2. Second semester.

Engl. 81. Undergraduate Thesis (3).

Open to advanced undergraduates who wish to submit theses in English First semester.

Engl. 82. Undergraduate Thesis (3).

Continuation of Engl. 81. Second semester.

Engl. 83. Readings in English Literature (3).

Open to advanced students who wish to pursue special courses of readings in English Literature. First semester.

Engl. 84. Readings in English Literature (3).

Continuation of Engl. 83. Second semester.

For Advanced Undergraduates and Graduates

The courses in this group are open to students of junior standing.

Engl. 117. Contemporary Drama (3).

Types of the drama. Mr. Christensen

Engl. 118. American Literature (3).

Movements that have shaped American thought and feeling as expressed in the national literature: Puritanism, Americanism, Romanticism, Transcendentalism, Individualism, the Civil War, Democracy, the West, Realism, Internationalism, and Skepticism, as presented by Jonathan Edwards, Franklin, Paine, Longfellow, Poe, Emerson, Thoreau, Mark Twain, Henry James, and Henry Adams. Summer session. Mr. Strauch

Engl. 120. The Novel (3).

The great masterpieces of prose fiction produced in England, in America, and on the Continent during the nineteenth and twentieth centuries. Development of types of the novel. The theory and technique of the novel. Summer session. Mr. Riley

Engl. 121. Contemporary Literature (3).

Present-day American literature. Collateral readings and reports. Book fee, $2.50. Prerequisites: six hours chosen from Engl. 3a, 3b; 4, 5, 6, 7; 8, 9; 18, 19; 20, 21, or from any of the courses in the 100 or 200 group. First semester. Messrs. Riley, Strauch

Engl. 122. Contemporary Literature (3).

Present-day English and European literature. Collateral readings and reports. Book fee, $2.50. Prerequisites: same as for Engl. 121. Second semester. Messrs. Riley, Strauch

Engl. 123. Shakespeare and the Elizabethan Drama (3).

The development of the English drama, including the important plays of Shakespeare. First semester. Mr. Smith

Engl. 124. Shakespeare and the Elizabethan Drama (3).

Continuation of Engl. 123. Second semester. Mr. Smith

Engl. 125. English Literature of the Romantic Era (3).

Poetry and prose of the chief romantic writers—Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Landor, Lamb, Hazlitt—with consideration of the political, religious, and social problems of the period as they are exhibited in the literature. Readings and Class discussions. First semester. Mr. Severs

Engl. 126. English Literature of the Victorian Era (3).

Poetry and prose of the chief victorian writers—Tennyson, Browning, Arnold, Clough, Rossetti, Morris, Swinburne, Macaulay, Carlyle, Mill, Newman, Ruskin—with considerations of the political, religious, and social problems of the period as they are exhibited in the literature. Readings and class discussions. First semester. Not given in 1944-45. Mr. Severs

Engl. 130. The Renaissance (3).

The non-dramatic literature of the English Renaissance, with especial emphasis upon the major writers of the late Elizabethan period and the 17th century. Spenser and Milton are not included. Second semester.

Mr. Riley

Engl. 131. Milton (3).

The life and works of John Milton in connection with the history of his times and the chief sources of his inspiration, including some study of Spenser and the Spenserians. Second semester. Not given in 1943-44.

Mr. Riley

Engl. 133. Restoration and Augustan Literature (3).

Prose and poetry from 1660 to 1745 with special emphasis upon the works of Dryden, Pope, and Swift, and some consideration of the influential ideas of Hobbes, Locke, Berkeley, and Hume. Second semester.

Mr. Clifford

Engl. 134. Age of Johnson (3).

English prose and poetry from 1745 to 1798. Dr. Johnson and his circle and the pre-romantics, including Burns and Blake. Not given in 1943-44. Second semester.

Mr. Clifford

Engl. 141. Biographies of Great Men (3).

A comparative study of biographical writing as illustrated by famous lives of great men in literature and history. Attention will be given to the development of biography and to the various theories and schools of biographical writing.

Mr. Clifford

For Graduates

Students desiring to take courses leading to the master's degree in English literature should have taken in their undergraduate work at least twelve semester hours of advanced courses in this field. Preliminary courses may be required of students to make up any deficiency before being admitted to candidacy for the master's degree.

Of the thirty hours required for the degree, at least eighteen must be in English major courses; fifteen of the thirty must be taken in courses chosen from the "200" group. A thesis, if required and accepted, is credited as six of the thirty hours. A student may choose collateral work amounting to six hours in courses not related to his major field, or take the full thirty hours in his major field. A final comprehensive examination, usually oral, covering the field of English literature, is required before the student is recommended for the degree.

Engl. 220. Graduate Seminar (3).

An intensive study of the works of an English author or a type of literature. Summer session.

Messrs. Smith, Riley, Severs

Engl. 221. Graduate Seminar (3).
Research and reports. First semester. Mr. Smith

Engl. 222. Graduate Seminar (3).
Continuation of Engl. 221. Second semester. Mr. Smith

Engl. 227. Anglo-Saxon (3).
A study of the Anglo-Saxon language and literature. Lectures and supplementary reading in the history of the English language and its relation to other Indo-European languages. First semester. Mr. Riley

Engl. 228. Chaucer (3).
A study of the life and principal works of Chaucer, with some attention to his chief contemporaries. Readings and reports, class discussions. Second semester. Mr. Severs

Engl. 229. Literary Criticism (3).
A course aimed to correlate and unify the student's previous work in literature by means of wide reading in critical literature and discussions of theories and schools of criticism. First semester. Mr. Smith

Engl. 230. Literary Criticism (3).
Continuation of Engl. 229. Second semester. Mr. Smith

Engl. 231. Graduate Thesis (3).
First semester. Mr. Smith

Engl. 232. Graduate Thesis (3).
Second semester. Mr. Smith

Engl. 233. Literature of the 14th Century (3).
Types of medieval literature with special attention to Langland, Gower, Chaucer. Mr. Severs

SPEECH

ASSISTANT PROFESSOR CALLAGHAN
MESSRS. RIGHTS AND EHRSAM

Speech 30. Fundamentals of Speech (3).
A foundation course designed to develop knowledge of the basic principles of speech, ability to speak effectively on the platform, and a critical attitude toward contemporary public address. Prerequisites: Engl. 1 and 2. First and second semesters.

Speech 31. Business Speaking (3).
Principles of individual problem-solving and group policy-deliberation; practice in the conduct of personal interviews and conferences; delivery of reports, instructions, and explanations; promotional, inspirational, and good-will talks; after-dinner speeches; speeches of courtesy; telephone speaking. Prerequisite: Speech 30. Second semester.

Speech 32. Argument and Discussion (3).

The technique of investigation, analysis, evidence, inference, brief making, and refutation in oral argument. Participation in the various types of debate, conventional, cross-examination, and direct-clash, and in various forms of discussion, with emphasis on the panel and the symposium. Each student selects a topic for investigation and argument throughout the semester. Prerequisite: Speech 30. Second semester.

Speech 33. Parliamentary Procedure (1).

Study and drill in modern rules and methods of conducting organized group-deliberation. Prerequisite: consent of the head of the department. First semester.

Speech 61. Dramatics (3).

The practical technique and production of plays; acting, stage-lighting, scenic design and execution, and student direction of plays. Each member must write either an original one-act play or a thesis upon any practical problem of the modern theater. One play is presented each semester. Prerequisites: Engl. 4 and 5. Fee, $3.00. Not offered in 1944-45.

Speech 62. Dramatics (3).

Continuation of Speech 61. Fee, $3.00. Not offered in 1944-45.

For Advanced Undergraduates and Graduates

Speech 160. Speech for the Teacher (3).

An orientation course in the field of speech for those engaged in classroom teaching or in directing extracurricular speech activities. Discussion as a teaching device; integration of speech with other subjects; recognition of common defects of speech; modern emphases in speech contests; individual investigations, report, and conferences. Summer session.

Mr. Callaghan

Speech 161. Dramatics (3).

A practical course in production of plays; problems of designing of scenic effects, directing, and acting. Particular attention will be given to the difficulties encountered by those who teach dramatics. A production will be given by the class. Fee, $5.00. Summer session. Mr. Rights

JOURNALISM

ASSOCIATE PROFESSOR BIGGS
MR. MOORHOUSE

Students majoring in journalism take Journ. 11, 12, 13, 14, 16, 18, 20. They must also register for and complete Journ. 1-8 each semester, after declaring their major. Other requirements include twelve hours to be chosen from the following courses: Engl. 4, 5, 8, 9, 20, 21, 123, and 124, or in such equivalents as may be allowed; and also Hist. 25 and 26 or 129 and 130, Govt. 51 and 52, Eco. 3 and 4, Soc. 161 and 162, and one of the follow-

ing: Govt. 157 and 158, Eco. 133 and 134, Eco. 11 and 113. During the junior or senior year a field trip to New York is taken to visit metropolitan newspaper plants, and the headquarters of press associations, feature syndicates, photo services, etc. In alternate years the trip is taken to Washington, D. C. The comprehensive examination in journalism includes the content of courses studied in the sophomore, junior, and senior years.

Journ. 1-8. Brown and White (1).

Enrollment constitutes membership on the staff of the semi-weekly paper. All composition work is for publication. Students enrolling for their first semester sign for Journ. 1; for their second semester, Journ. 2; etc. By faculty action this course may be elected each semester for credit in addition to other courses in a student's roster. Students also enroll in Journ. 1-8 for the business staff of the paper. Fee, $1.00. First and second semesters.

Journ. 11. Newspaper Reporting and Writing (3).

A beginning course in newspaper journalism. Definition of news; news values and reader interest; structure of the news story; newspaper English; how to report and write simple news stories. Prerequisites: Engl. 1 and 2. Fee, $2.00. First semester.

Journ. 12. Advanced Newspaper Reporting and Writing (3).

Continuation of Journ. 11. A course in the reporting and writing of particular types of news, including sports-writing. Special attention is paid to news of public affairs. Fee, $2.00. Second semester.

Journ. 13. Newspaper Editing and Copy Reading (3).

Study and practice of the technique of the newspaper copy reader and news editor; headline writing and makeup. Prerequisites: Journ. 11 and 12. Fee, $1.50. First semester.

Journ. 14. Press Photography (3).

A study of the fundamentals of taking pictures, developing negatives, and making enlargements for publication purposes. Course includes a background understanding of camera, lenses, filters, etc.; and includes a laboratory period in use of camera, developing film, and enlarging. First and second semesters.

Journ. 15. Editorial Writing and Modern Problems (3).

The content and technique of the editorial. Discussion of modern problems and review of individual prejudices as preliminary to writing of editorials on contemporary events. Includes other types of critical writing: dramatic and book reviews.

Journ. 16. Newspaper Problems and Policies (3).

A study of the ethical principles of newspaper publishing. "To print or not to print" sensational or "yellow" journalism; tabloids; faking;

ghost writing; crusades. Study of the law of libel and of postal regulation governing newspapers. Prerequisites: junior standing. Second semester.

Journ. 17. Newspaper Feature Writing and News Photography (3).

Writing of all kinds of feature articles from newspaper "brighteners" and columns to articles of the Sunday magazine type. Includes a study of the fundamentals of taking pictures, developing negatives, making prints; and an understanding of the news-type camera.

Journ. 18. History of American Journalism (3).

English background of American newspaper; development of press from colonial days to the present; influence of newspaper on American life; contributions of outstanding journalists. Prerequisite: junior standing. Second semester.

Journ. 20. Journalism Proseminar (3).

Required of students of senior standing who are majoring in journalism. Survey of the newspaper field in its relation to public affairs. Extensive reading in books, magazines, and newspapers. Second semester.

Journ. 21. Writing for Publication (3).

A study of modern magazines and publications as interpreters of contemporary civilization, supplemented by writing for such publications in whatever field the individual student is interested. Prerequisites: *Engl. 1 and 2.* First semester.

Journ. 22. The Short Story (3).

A course in writing fiction, supplemented by a study of the short story as a form of expression. Class discussion, round-table discussion of student writing, and collateral reading. Prerequisites: *Engl. 1 and 2.* Second semester.

Journ. 43. Writing for Business.

Study and practice in writing business news stories and reports which the business man must prepare; the employee magazine. Prerequisites: Engl. 1 and 2. First and second semesters.

For Advanced Undergraduates and Graduates

Journ. 101. Modern Newspaper Practice (3).

A practical course dealing primarily with the methods of securing, writing, and editing news. The evaluation and organization of materials; practice in the preparation of news for publication. Study of news sources and values and reader interest. The place of the press in modern society. The difficulties encountered by faculty advisers of secondary school publications; individual conferences with such advisers. Summer session. **Mr. Biggs**

FINANCE

PROFESSOR BRADFORD

Fin. 21. Corporation Finance (3).

The methods of corporations in obtaining capital, issuing securities, and extinguishing debts, the rights and obligations of security holders and problems of corporation insolvency and dissolution. Prerequisite: *Eco. 4.* Not offered in 1943-44. First semester.

Fin. 22. Corporation Finance (3).

Continuation of Fin. 21. Prerequisites: *Eco. 4;* Fin. 21. Not offered in 1943-44. Second semester.

Fin. 25. Corporation Finance (3).

An intensive course covering the fundamentals of corporation finance in one semester. Especially designed for engineering students. Prerequisite: *Eco. 4.* First semester.

Fin. 33. Money and Banking (3).

The nature and development of money and banking, the principles of banking; Federal Reserve policy and practice; the value of money; monetary and banking problems; non-commercial banking. Primary prerequisite: *Eco. 4.*

For Advanced Undergraduates and Graduates

Fin. 123. Investments (3).

A study, from the standpoint of the investor, of the various types of corporation and government securities, with special reference to owners' equities, comparative yields and the machinery of investment, including stock exchange operations. Prerequisite: *Fin. 22 or 25.* First semester.
Mr. Bradford

Fin. 124. Investments (3).

A project course in investment analysis for advanced students who are already familiar with investment principles. Sources of data and analysis procedures; the securities of industrials, railroads, public utilities, and municipalities. Prerequisite: *consent of the head of the department.* Not offered in 1943-44. Second semester. Mr. Bradford

Fin. 126. Public Finance (3).

A one-semester course dealing with government expenditures and revenues, public debts and taxation, with emphasis on the economics and the administration of federal and state taxes. Prerequisite: *Eco. 4.* Second semester. Mr. Bradford

Fin. 131. Banking and Credit Problems (3).

An intensive study of the major banking, credit, and monetary problems and policies of current interest to the banker and the public. Prerequisite: *Fin. 33.* Not offered in 1943-44. First semester. Mr. Bradford

Fin. 132. Banking and Credit Problems (3).

Continuation of Fin. 131. Prerequisites: *Fin. 33;* Fin. 131. Not offered in 1943-44. Second semester. Mr. Bradford

Fin. 135. Transportation (3).

The economics of transportation by rail, highway, water, pipeline, and air. Effects of transport costs on prices and on location of industries and markets, rate theory and practice, regulation, finance, government ownership, and coordination. Prerequisite: *Eco. 4.* First semester. Mr. Bradford

Fin. 136. Public Utilities (3).

Rate making, finance, combination, public ownership, federal power policy, and related problems in the electric, gas, and telephone industries. Prerequisite: *Eco. 4.* Second semester. Mr. Bradford

Fin. 171. Readings in Finance (3).

A course of readings in various fields of finance, designed for the student who has a special interest in some field of finance not covered by the regularly rostered courses. Prerequisites: senior standing and consent of the head of the department. First semester. Mr. Bradford

Fin. 172. Readings in Finance (3).

Continuation of Fin. 171. Prerequisites: senior standing and consent of the head of the department. Second semester. Mr. Bradford

FINE ARTS

ASSOCIATE PROFESSOR HOWLAND

F.A. 3. History of Architecture (3).

The development of architecture from its beginning in Egypt and Mesopotamia, through Greece and Rome, the Early Christian period, and the Romanesque; and briefly the architecture of the Orient. First semester.

F.A. 4. History of Architecture (3).

Continuation of F.A. 3. The development of Gothic architecture, the Renaissance, and successive movements down to and including the present day. Second semester.

F.A. 5. Freehand Drawing (3).

Elementary freehand perspective, followed by drawing from still life objects and casts in pencil, charcoal, and in the various modes: delineation, form-drawing, color value. First semester.

F.A. 6. Freehand Drawing (3).

Further practice in expression; color theory with simple exercises in water colors or oils. Second semester.

F.A. 11. Ancient and Medieval Art (3).

An approach to the understanding and enjoyment of the arts. The development of art is traced through the ancient and medieval periods. The relation between artistic expression and the age which produced it. Lectures. Open to freshmen. First semester.

F.A. 12. The Art of the Italian Renaissance (3).

Painting, sculpture and architecture are examined as the outgrowth of conditions in Italy during the fourteenth, fifteenth, and sixteenth centuries; the influence of medieval thought and tradition, the awakening interest in nature, the effect of antiquity, especially the stimulus it gave to individual effort. Lectures. Open to freshmen. Second semester.

F.A. 13. The Art of the Northern Renaissance (3).

Art in Europe other than Italy from the fifteenth century to the French Revolution. Contrasts between native tendencies and foreign influences, especially those of the Italian Renaissance, with the resulting struggle between idealism and realism. Lectures. Prerequisites: F.A. 12. First semester.

F.A. 14. Modern Art (3).

The nineteenth and twentieth centuries. The historical relationships, the underlying theories, and the influence of contemporary thought as aids in understanding modern art. The treatment includes Classicism, Romanticism, Impressionism, and the various modern schools. Prerequisite: F.A. 11 or 12. Second semester.

F.A. 17. Criticism and Analysis of Art (3).

A critical analysis of the divergent views of the nature of art, its origin and intention. The ancient writers are consulted for views held in Greece and Rome. Factors in molding art opinion in the Middle Ages. Changes in the Renaissance. Primarily for majors. Prerequisites: F.A. 11 and 12, or suitable preparation in the history of fine arts, and consent of the head of the department. First semester.

F.A. 18. Criticism and Analysis of Art (3).

Continuation of F.A. 17 with special attention to art criticism since the 17th century. Prerequisite: same as for F.A. 17. Second semester.

F.A. 19. Prints and Print Processes (3).

History and methods of making wood-cuts, engravings, etchings, aquatints, mezzotints, lithographs. Laboratory experiments when practicable. Prerequisite: consent of the instructor. Offered only whene there is no demand for F.A. 17 and 18. Second semester.

F.A. 25. Principles and Practices of Landscape Painting (3).

Oil painting based upon the principles which underlie the treatment of landscape. The greater portion of the time is devoted to actual painting

from nature, in accordance with the methods and theories employed by artists of various schools. Weekly lectures, illustrated by lantern slides and color-reproductions, on composition, technique, color, light, plastic and spatial effects, mood. Prerequisite: consent of the head of the department. Summer session.

FRENCH

See Romance Languages

GEOLOGY

PROFESSORS WILLARD AND B. L. MILLER
ASSOCIATE PROFESSORS FRETZ, WHITCOMB, AND STEWART

Geol. 1. Mineralogy (3).

The principles of crystallography with practice in determination of forms of models and crystals; the physical properties, origin, occurrence, association, and alteration of minerals; a study of about one hundred twenty of the common mineral species and varieties, with practice in identification based on physical properties and blowpipe analysis. Students should have had Chem. 1 or 2, and 11 or 12, or 3 and 13 or 14. Fee, $5.00. First semester.

Geol. 2. Engineering Mineralogy (2).

Elementary crystallography and the occurrence and properties of the common minerals. Elements of crystal structure, and physical and chemical properties of crystals. Students should have Chem. 1 and 11 or 12; or 3 and 13 or 14. Planned for the metallurgical engineering curriculum and for students in chemistry and physics. Fee, $5.00. First semester.

Geol. 5. Petrology (3).

Macroscopic study of igneous, sedimentary, and metamorphic rocks; their origin, classification, and identification. Prerequisite: Geol. 1 or 2. Second semester.

Geol. 8. Historical Geology (3).

The development of the continents and life forms; evolution based on the remains of animal and plant life preserved in the rocks. Text book, lectures, and laboratory exercises. Prerequisite: Geol. 10, or 16 and 17. Second semester.

Geol. 9. Engineering Geology (3).

Designed primarily for engineering students. Selected minerals, rocks, building stones, and road materials. Applications of geology to the construction of dams, tunnels, building foundations, and highways, and to the problems of underground water conditions, flood control, etc. Two lectures and one laboratory per week. Prerequisite: Geol. 10. Second semester.

Geol. 10. Principles of Geology (3).

An introductory survey of geologic processes. Lectures, field trips, laboratory exercises on common minerals, rocks, ores, fossils, and the study of topographic maps. Fee, $1.00. First and second semesters.

Geol. 16. Physiography (3).

The origin, history, and economic signficance of topographic features, soils and natural resources; occasional field trips and laboratory work devoted to instruction and practice in the interpretation and construction of topographic maps. First semester. Not given in 1944-45.

Geol. 17. Physiography (3).

Continuation of Geol. 16. Meteorology, climatology, oceanography, and geographical location. Factors constituting the natural environment in their effect upon man. Laboratory and field exercises. Prerequisite: Geol. 16. Not given in 1944-45. Second semester.

Geol. 18. Meteorology and Climatology (3).

The atmosphere and its work; investigations of climate. One laboratory period each week is devoted to meteorological instruments, preparation, and interpretation of weather maps and other meteorological data, and making forecasts. Not given in 1944-45. Second semester.

For Advanced Undergraduates and Graduates

Geol. 101. Applied Mineralogy Laboratory (1).

Preparation of polished surfaces of metallic ores and mill products. Identification of minerals by reflecting microscope and etching methods. Interpretation of textures and structures of ores with special reference to origin. Relation of textures and structures to ore dressing processes and concentration problems. For students interested in study of the metallic ores and their concentration. Prerequisite: Geol. 108 (may be taken concurrently). Second semester. Not given in 1944-45.

Geol. 107. Non-metallic Economic Geology (2).

The origin, modes of occurrence, properties, sources, production, and uses of non-metallic mineral products exclusive of the mineral fuels. Prerequisites: Geol. 5, and 10 or 16 and 17. First semester. Mr. Stewart

Geol. 108. Metallic Economic Geology (3).

The geological occurrence, origin, distribution, uses, and commercial production of metalliferous minerals; consideration of the most important mining districts. Recitations, illustrated lectures, field trips, and laboratory examination of ore specimens from representative districts. Prerequisites: Geol. 5 and 8. Second semester. Mr. Stewart

Geol. 109. Paleontology (3).

Plants and animal fossils from the morphologic point of view; their use in interpreting geologic history; evolution of the faunas and floras Lectures and laboratory work. Prerequisites: Geol. 10, or 16 and 17; or Biol. 1, 10 or 7 and 8. First semester . Mr. Whitcomb

Geol. 110. Stratigraphy and Sedimentation (3).

The origin, history, sequence, and correlation of bedded rocks, their faunas, ages, distribution, and structures. Lectures, laboratory, and field trips. Prerequisites: *Geol. 10, or 16 and 17, 8;* Geol. 1, 5, 109. Second semester. Mr. Willard

Geol. 111. Field Geology (2).

Practice in mapping and field work. Each student is assigned a definite area and is required to prepare a report thereon with geologic map, structure section, and collection of a full set of specimens. Prerequisites: *Geol. 10, or 16 and 17, 1, 5, 8, 110, 114,* Geol. 107, 108, 109, 124. Fee, $1.00. First semester. Mr. Willard

Geol. 114. Structural Geology (3).

The major and minor structures encountered in both the massive and the layered rocks of the earth's crust. Typical problems of the type encountered in geological, geophysical, and mining work are studied in the laboratory. Prerequisite: Geol. 10. First semester. Mr. Whitcomb

Geol. 116. Proseminar (1).

Investigation of current and classic geological literature. Assigned reading and reports. Participated in by members of the teaching staff and advanced students. First and second semesters.

Geol. 117. Geochemistry (2).

The chemical and physiochemical processes involved in the formation of minerals, precipitation of sediments, solidification of igneous rocks, ore deposition, metamorphism, weathering, and related problems involved in the origin and subsequent changes of the igneous and sedimentary rocks. Prerequisites: *Geol. 5; Geol. 10, or 16 and 17;* Geol. 123, 124. First semester. Mr. Stewart

Geol. 118. Geology of Mineral Fuels (3).

Origin and occurrence of coal, oil, gas, and other bitumens. Characteristics of domestic and foreign fields. Laboratory period devoted to discussion and solution of geological problems encountered. Prerequisite: Geol. 10, or Geol. 16 and Geol. 17, and Geol. 8. Second semester. Mr. Stewart

Geol. 123. Optical Crystallography (3).

The polarizing microscope and its application in the examination and identification of minerals by the immersion method and in thin section. Prerequisites: *Geol. 1, 5, and 10.* First semester. Mr. Stewart

Geol. 124. Petrography (3).

Microscopic studies of igneous, sedimentary and metamorphic rocks in thin section. Prerequisites: *Geol. 1, 5, 10, and 123.* Second semester. Mr. Stewart

Geol. 128. Crystal Structure (2).

Concept of symmetry from viewpoint of structural crystallography. Various types of structures and relations to physical and chemical proper-

ties. Application of theory of crystal structure to solid solution, exsolution, isomorphism, inversions, and polymorphism. Interpretation of crystal structure data. Assigned reading of literature. Designed for students in physics, chemistry, metallurgy, and geology who are interested in X-ray investigation and modern theory of atomic structure. Prerequisites: Geol. 1 or 2; Chem. 1 and 11; Math. 1, Phys. 22, or their equivalent. Not given in 1944-45. First semester.

Geol. 171. Geological Problems (1 to 4).

Special problems in field, laboratory, and library. Specific work is assigned in individual cases. Prerequisite: completion of substantially all of the "100" courses in geology. Prospective students for this course should consult the department head. First semester.

Messrs. Willard, Miller, Whitcomb, Stewart

Geol. 172. Geological Problems (1 to 4).

Similar to Geol. 171. Geol. 172 may be elected as a continuation of Geol. 171 or separately. Prerequisites as for Geol. 171. A maximum of 6 credit hours for Geol. 171 and 172 only may be counted. Prospective students should consult the department head. Second semester.

Messrs. Willard, Miller, Whitcomb, Stewart

For Graduates

Geol. 220. Geological Investigation (1 to 6).

The investigation of special problems. Field, laboratory, library work on some limited area; presentation of a report thereon. Prospective students should consult the department head. Geol. 220 may be elected separately from Geol. 221. First semester.

Messrs. Willard, Miller, Whitcomb, Stewart

Geol. 221. Geological Investigation (1 to 6).

Similar to Geol. 220. May be elected as a continuation of Geol. 220 or separately. Prospective students should consult the department head.

Messrs. Willard, Miller, Whitcomb, Stewart

Geol. 222. Advanced Economic Geology (3 to 6).

Advanced work in ore deposits. Theories of ore deposition, together with detailed work on the type occurrences of some of the metallic or non-metallic minerals; thorough investigation and report on some mining district with special regard to the origin of the ores and such commercial aspects of the deposits as may depend chiefly on the geology; preparation and microscopic study of specimens of ores. Prerequisites: Geol. 107, 108. First semester. Mr. Stewart

Geol. 223. Advanced Economic Geology (3 to 6).

Continuation of Geol. 222. Second semester. Mr. Stewart

Geol. 225. Advanced Physiography (4).

The detailed study of physiographic types and processes. Conferences, reports, and thesis, with work in the laboratory and field. Prerequisite: training in elementary physiography and general geology. First semester.

Mr. Whitcomb

Geol. 227. Physical Crystallography (2).

An advanced course in the geometrical and physical properties of crystals with special reference to the Goldschmidt method of crystal measurement and projection. Prerequisites: Geol. 1, Phys. 24. Not given in 1944-45. Second semester.

Geol. 229. Coal Research (3).

The constitution of coal, embracing the preparation and microscopical examination of thin sections and polished surfaces and including a review of the literature describing other investigations. Not given in 1944-45. First and second semesters.

Geol. 230. Advanced Paleontology (3).

A detailed study of selected groups of fossils, generic and specific differences, identifications, descriptions, and preparation of fossils. First semester.

Messrs. Willard, Whitcomb

Geol. 231. Advanced Historical Geology (4).

An advanced course dealing with the problems of historical and stratigraphic geology. Reading and conferences. Second semester.

Messrs. Willard, Whitcomb

GERMAN

PROFESSORS PALMER AND MORE
ASSISTANT PROFESSOR TREMPER

Ger. 1. Elementary German (3).

First semester.

Ger. 2. Elementary German (3).

Continuation of Ger. 1. Prerequisite: *Ger. 1 or the equivalent.* Second semester.

Ger. 3. Intermediate German (3).

German prose and poetry. Outside reading. Composition. Prerequisite: *one year of college German or entrance German A.* First semester.

Ger. 4. Intermediate German (3).

Continuation of Ger. 3. Prerequisite: *Ger. 3 or the equivalent.* Second semester.

Ger. 7. German of Chemistry (3).

Rapid reading of selected texts on chemistry. Prerequisite: *one year of college German or entrance German A.* First or second semester.

Ger. 9. Advanced German, Prose and Poetry (3).

Rapid reading of representative texts; collateral reading. Prerequisite: *two years of college German or entrance German B.* First semester.

Ger. 10. Goethe's Faust (3).

Study of Part 1. Lectures on the origin and development of the Faust story; collateral reading. Prerequisite: *Ger. 9 or high standing in Ger. 3, 4, or 7.* Second semester.

Ger. 22. Conversation and Composition (3).

Review of German grammar. German composition, and conversation. Prerequisite: *Ger. 10 or high standing in Ger. 3, 4, or 7.* First or second semester.

For Advanced Undergraduates and Graduates

Ger. 111. Nineteenth Century German Drama (3).

Lectures, reading, reports on assigned work. Prerequisite: *Ger. 10 or the equivalent.* First semester. Messrs. Palmer, More

Ger. 112. Nineteenth Century German Drama (3).

Continuation of Ger. 111. Prerequisite: *Ger. 10 or the equivalent.* Second semester. Messrs. Palmer, More

Ger. 113. Lessing, Goethe, and Schiller (3).

Prerequisite: *Ger. 10 or the equivalent.* First semester. Mr. Palmer

Ger. 114. Lessing, Goethe, and Schiller (3).

Continuation of Ger. 113. Prerequisite: *Ger. 10 or the equivalent.* Second semester. Mr. Palmer

Ger. 115. The German Short Story (3).

Origin and development. Rapid reading of illustrative stories, with particular attention to Gottfried Keller, Theodor Storm, C. F. Meyer, and Paul Heyse; lectures and reports. Prerequisite: *Ger. 10 or the equivalent.* First semester. Mr. Tremper

Ger. 116. The German Short Story (3).

Continuation of Ger. 115. Prerequisite: *Ger. 10 or the equivalent.* Second semester. Mr. Tremper

GOVERNMENT

See History and Government

GREEK

ASSISTANT PROFESSOR McDONALD

Gk. 1. Elementary Greek (3).

For all students who desire to obtain a fundamental knowledge of the Greek language. Early in the semester there will be reading in stories and legends in easy Greek. First semester.

Gk. 2. Elementary Greek (3).

Continued work in Greek vocabulary, forms, and syntax. Selections from Xenophon's *Anabasis*. Second semester.

Gk. 3. Second-Year Greek (3).

Anabasis; Iliad (if time permits); grammar and simple composition. (Offered only when Gk. 1 and 2 have been given in the preceding year). Prerequisites: Gk. 1 and 2, or one year of entrance Greek. First semester.

Gk. 4. Second-Year Greek (3).

Continuation of Gk. 3. Second semester.

Gk. 7. Thucydides (3).

One or more books. Composition. Prerequisites: Gk. 15 and 16. First semester.

Gk. 8. Tragedy (3).

Euripides, *Medea, Bacchae,* or another play. Sophocles, *Oedipus Tyrannus, Antigone,* or another. Literary study of the drama; poetical language, style, and conception; metrical reading; composition. Prerequisites: Gk. 15 and 16. Second semester.

Gk. 9. Dramatic Poetry (3).

Aeschylus, *Agamemnon* or *Prometheus Bound.* Aristophanes, *Clouds, Frogs,* or *Birds.* Aristophanes as humorist and as moralist, with consideration of the tendencies which he satirized. Meters. Elementary text-criticism. Prerequisites: Gk. 8, 15, and 16. First semester.

Gk. 10. Greek Oratory (3).

Selections from the earlier Attic orators and Desmosthenes. Rapid reading, the student being supposed to have reasonable facility in understanding the Greek directly without rendering into English. Attention is directed largely to those points which illustrate the development of Greek prose style. Prerequisites: Gk. 15 and 16. Second semester.

Gk. 11. Homer (3).

Rapid reading of considerable portions of the *Iliad* or the *Odyssey.* Homeric language, syntax, and meter reviewed with some reference to the needs of intending teachers, but chiefly as a foundation for the study outlined in Gk. 12. Prerequisites: Gk. 15 and 16. First semester.

Gk. 12. Lyric Poetry (3).

Fragments of the Elegiac, Iambic and Melic poets; selections from Pindar of Theocritus. Prerequisites: Gk. 11, 15 and 16. Second semester.

Gk. 13. Hellenistic Greek (3).

New Testament. Selections from Lucian. To be submitted on occasion for Gk. 12. Prerequisites: Gk. 15 and 16, and the approval of the professor. Second semester.

Gk. 15. Homer and Herodotus (3).

Iliad, I-III, or selected books of the *Odyssey.* Herodotus,—selections. Study of the forms and syntax of the Homeric and Ionic dialects; grammatical analysis; reading aloud of Greek; sight-reading; composition. Prerequisites: Gk. 1, 2, 3, and 4, or entrance Greek. First semester.

Gk. 16. Plato (3).

Euthyphro, Apology, or other shorter dialogues. Grammar and composition as in the first semester. Prerequisite: Gk. 15. Second semester.

Courses Gk. 9 and 11, 10 and 12 (or 13) are offered in alternate years, and are open to both juniors and seniors.

Gk. 83. The Economic and Social Life of the Greeks (3).

A study of the activities of the Greeks with special reference to domestic arts, religion, athletics, warfare, medicine, education, social customs and commerce. Numismatics and vase painting. Lectures, collateral readings, and reports. Prerequisite: *consent of the instructor.* First semester.

Gk. 99. Ancient Science (3).

A study of the architecture, mining, machinery, medicine, husbandry, etc. as developed by early peoples, especially by the Greeks and the Romans. A comprehensive view of the knowledge and use of natural resources. No knowledge of the Greek or Latin language is required. Second semester.

For Advanced Undergraduates and Graduates

Gk. 100. Greek Literature in English Translation (3).

The development of the major departments of Greek literature with required readings in English translations, with special attention to the epic, drama, and lyric poetry. First semester. Mr. McDonald

Gk. 121. Alexander the Great and the History of the Hellenistic Period (3).

A study of the political and social conditions of the Hellenistic period and the Greek influence upon contemporary and later civilization. First semester. Mr. McDonald

Gk. 181. Greek Archaeology (3).

Aims and Methods. A chronological presentation of prehistoric civilizations including the Neolithic, Minoan, Helladic, and Mycenean periods. A study of extant ancient monuments, buildings, and city plans of important sites of the classical and hellenistic periods. Lectures, collateral readings, and reports. Prerequisite: *consent of the instructor* First semester. Mr. McDonald

For Graduates

Candidates must satisfy the head of the department as to their adequate preparation for advanced work. Ordinarily students will be expected to have had in their undergraduate work at least four years of work in Greek.

Gk. 201. Greek Poetry (3).

The development of poetry in Greece from Homer to the drama, with special study of the lyric poets, and collateral reading. First semester. Mr. McDonald

Gk. 202. Greek Poetry (3).

Continuation of Gk. 201. Second semester. Mr. McDonald

Gk. 203. Greek Philosophy (3).

The history of philosophic thought in Greece, particularly in the pre-Socratic period, Ritter and Preller's *Historia Philosophiae Graecae,* and collateral reading. First semester. Mr. McDonald

Gk. 204. Greek Philosophy (3).

Continuation of Gk. 203. Second semester. Mr. McDonald

Gk. 205. Hellenistic Greek (3).

Portions of the Gospels in a comparative study, the Acts, and selected *Epistles.* Chapters from the *Septuagint* Patristic literature. Collateral readings. Selections from Lucian. First semester. Mr. McDonald

Gk. 206. Hellenistic Greek (3).

Continuation of Gk. 205. Second semester. Mr. McDonald

HISTORY AND GOVERNMENT

PROFESSORS GIPSON AND HARMON
ASSOCIATE PROFESSORS SCHULZ, GODSHALL, AND ETTINGER

HISTORY

Hist. 13. United States History (3).

The era of constitution-making; the evolution of political parties; foreign relations during the wars of the French revolutionary period; the western movement and western state-building; the growth of sectionalism. First semester.

Hist. 14. United States History (3).

The war for the Union; the reconstruction of the South; the era of big industry and labor combinations; the United States as a world power; the new national paternalism. Second semester.

Hist. 25. European History (3).

A rapid survey of the major historic forces from the collapse of the Roman Empire to the sixteenth century. The cultural aspects of medieval society. Not given in 1944-45. First semester.

Hist. 26. European History (3).

Continuation of Hist. 25. A detailed account of historic developments from the sixteenth to the nineteenth centuries. Not given in 1944-45. Second semester.

Hist. 27. European Expansion and Empire-Building, 1492-1700 (3).

Aspects of the phenomenon of the spread of European civilization and empire into the continents of America, Asia, and Africa. Not given in 1944-45. First semester.

Hist. 28. European Expansion and Empire-Building, 1700-1820 (3).

The rivalry of imperial systems; the disappearance of French power in the New World; the movements for independence of the English, Spanish and Portuguese colonials. Not given in 1944-45. Second semester.

Hist. 29. Modern Europe (3).

The study of Revolution and reaction in Western Europe between 1789 and 1870. Emphasis is laid upon the birth, growth, and spread of nineteenth-century liberal doctrines as well as upon the attempts made to stifle that growth by every political and diplomatic means available. Not given in 1944-45. First semester.

Hist. 30. Modern Europe (3).

The study of the rise of the new imperialism between 1870 and the present with emphasis laid upon the political factors in the break-down of the imperial system. Not given in 1944-45. Second semester.

Attention is called also to the following courses in history offered by other departments: ANCIENT HISTORY, THE ROMAN REPUBLIC, and THE ROMAN EMPIRE, by the department of Latin; INDUSTRIAL EVOLUTION by the department of Economics and Sociology.

For Advanced Undergraduates and Graduates

Hist. 115. Political and Social History of England (3).

The history of the rise and growth of English political and social institutions prior to 1603. Not given in 1944-45. First semester.

Mr. Ettinger

Hist. 116. Political and Social History of England (3).

The history of the development of English political and social institutions from the death of Elizabeth to the present. Emphasis is placed upon the political and intellectual legacy bequeathed to the modern world as a result of this development. Not given in 1944-45. Second semester.

Mr. Ettinger

Hist. 119. Proseminar (3).

This course is concerned with eighteenth-century European civilization. The constitutional, political, economic, and social developments within, and institutions of the more dynamic European states of Great Britain, France, Prussia, and Russia will be contrasted and compared. First semester. Mr. Gipson

Hist. 120. Proseminar (3).

This course is concerned with eighteenth-century imperialism. The constitutional, political, economic and social developments within, and institutions of the New World empires of Great Britain, France, Spain, and Portugal when at the height of their power will be contrasted and compared. Second semester. Mr. Gipson

Hist. 122. England Under Elizabeth (3).

Queen Elizabeth and her contemporaries, with a discussion of social, political, and economic backgrounds. Not given in 1944. Summer session.

Mr. Ettinger

Hist. 123. England and the Early Stuarts (3).

Constitutional and political development of the first half of the seventeenth century; a survey of social England. Not given in 1944. Summer session. Mr. Ettinger

Hist. 129. American Foreign Policy (3).

The French alliance; independence and boundaries; commercial restrictions; French Revolution and neutrality; purchase of Louisiana; War of 1812; acquisition of Florida; Monroe Doctrine; relations with France and Great Britain; Oregon and Texas; the Mexican War. First semester. Mr. Harmon

Hist. 130. American Foreign Policy (3).

The Civil War and possible European intervention; Alaska boundary; War with Spain; the new Caribbean policies; the World War of 1914-1918 and its aftermath; diplomatic events preceding Pearl Harbor; outbreak and prosecution of the War; plans for peace. Second semester.

Mr. Harmon

Hist. 135. The Cultural History of Western Europe (3).

The study of the heritage bequeathed to modern man by the cultural achievements and traditions of the middle ages and Renaissance. Not given in 1944-45. First semester. Mr. Ettinger

Hist. 136. The Cultural History of Western Europe (3).

A continuation of the preceding from the time of the Reformation to the present with emphasis upon the rise of the national states through the period of the industrial revolution and their cultural characteristics. Not given in 1944-45. Second semester. Mr. Ettinger

Hist. 139. The Civil War (3).

Background of the Civil War; Buchanan's policy; Lincoln's attitude; views of Davis; Northern and Southern leaders contrasted. Not given in 1944-45. First semester. Mr. Harmon

Hist. 140. Reconstruction of the Union (3).

Problems of a restored Union; the policy of Johnson; views of the North and South; radical reconstruction; the election of Grant; the Supreme Court and reconstruction; the restoration of white supremacy in the South. Not given in 1944-45. Second semester. Mr. Harmon

Hist. 149. Hispanic America in the Nineteenth Century (3).

Successful movements for independence, recognition, types of governments formed in South, Central, and Caribbean America, wars and revolutions, problems pertinent to foreign trade, application of the Monroe Doctrine and its acceptance. First semester. Mr. Harmon

Hist. 150. Hispanic America in the Twentieth Century (3).

Continuation of Hist. 149. Results of the Spanish-American War, Theodore Roosevelt and "big stick" diplomacy, Panama Canal and world trade, debts and interventions. Pan-Americanism, World War and its influence, recent United States relations with Latin America. Second semester. Mr. Harmon

Hist. 151. A Pro-Seminar in United States and Pennsylvania History for Teachers (3).

This course is designed to meet the certification requirements of the Pennsylvania State Council of Education, that all teachers in the public schools should have a course in United States history in which particular emphasis is placed upon the history of Pennsylvania. The following topics will be stressed in the pro-seminar: American colonization; racial origins; the beginnings of agriculture, industry and commerce; the expansion of the frontiers; the movement for independence; constitution-framing; the party system of government; cultural tendencies and progress toward social betterment; the problem of states versus national rights; the era of great industry. Summer session. Mr. Gipson or Mr. Harmon

Hist. 160. History of American Political Parties (3).

Evolution of major and minor political parties, including the Federalist and Anti-Federalist, the Democratic and Republican, the Populist and Progressive. Party organization and functions; the economic and sectional basis of politics; nomination and election methods; the conduct of campaigns. Not given in 1944. Summer session. Mr. Harmon

Hist. 170. The World Since 1919 (3).

The peace treaties of 1919; the ideals and realities of the League of Nations; efforts to achieve disarmament and lasting peace; resurgence of power politics as displayed by the German-Italian-Japanese Axis; appeasement; frustration. Summer session. Mr. Godshall

Hist. 175. Leading Figures in European History (3).

A series of biographical studies treating of men and women in church and state from Charlemagne to Napoleon. Emphasis is cultural rather than purely historical. Not given in 1944. Summer session.
Mr. Ettinger

Hist. 179. The Far East Since 1800 (3).

A historical survey of the opening of China and Japan, the transformation of Japan, the partition of China, international rivalries in Korea, Manchuria, and the Philippines; economic and territorial imperialism, and Japanese quests for hegemony. Not given in 1944-45. First semester. Mr. Godshall

Hist. 180. Politics and Problems of the Far East (3).

An analysis of contemporary political and economic problems confronting not only the countries of the Orient but the Western Powers with interests in that region; Japanese aggression and conquests; violations of national rights; military rule; puppet government; military, aerial, and naval strategy; the New Order in Asia; prerequisites of peace in the Far East. Not given in 1944-45. Second semester. Mr. Godshall

For Graduates

Students desiring to major in history and government should have had at least twelve semester hours in connection with their undergraduate work that bear upon this field of study or in other ways should satisfy the department that they are in a position to undertake profitably the required program for the master's degree. Students should register for graduate work only after consultation with the head of the department.

Hist. 201. English Institutional History (3).

Political, social, economic, and religious institutions which have most profoundly influenced American civilization. Not given in 1944-45. First semester. Mr. Ettinger

Hist. 202. English Institutional History (3).
Continuation of Hist. 201. Not given in 1944-45. Mr. Ettinger

Hist. 203. England Under the Tudors (3).
An intensive study of England during the period 1485-1603. Special emphasis will be placed upon the social background. Not given in 1944-45. First semester. Mr. Ettinger

Hist. 204. England Under the Tudors (3).
A continuation of Hist. 203. Not given in 1944-45. Second semester. Mr. Ettinger

Hist. 205. England Under the Stuarts (3).
A study of the religious, political, and economic problems of the seventeenth century. Not given in 1944-45. First semester. Mr. Ettinger

Hist. 206. England Under the Stuarts (3).
A continuation of Hist. 205, but with particular stress upon social and literary activities. Not given in 1944-45. Second semester. Mr. Ettinger

Hist. 210. The British Commonwealth of Nations (3).
A survey of the British Empire during the nineteenth century, its metamorphosis into the Commonwealth of Nations, and an attempt to estimate its present significance. Not given in 1944. Summer session. Mr. Ettinger

Hist. 211. English Colonization in North America in the Seventeenth Century (3).
The activities of the great overseas trading companies; the problem of proprietorial control; the decline of the chartered colonies; conflicts between opposing political, economic, and religious ideals within the colonies. Not given in 1944-45. First semester. Mr. Gipson

Hist. 212. English Colonization in North America in the Seventeenth Century (3).
Continuation of Hist. 211. Not given in 1944-45. Second semester. Mr. Gipson

Hist. 213. America in the Eighteenth Century (3).
The workings of the English merchantile system; the evolution of colonial institutions; the international struggle for the fur trade in North America; George III and the new administrative system. Not given in 1944-45. First semester. Mr. Gipson

Hist. 214. America in the Eighteenth Century (3).
Continuation of Hist. 213. Not given in 1944-45. Second semester. Mr. Gipson

Hist. 215. American Constitutional History (3).
The major problems involved in the growth of the powers of the national government. First semester. Mr. Harmon

Hist. 216. American Constitutional History (3).

Continuation of Hist. 215. Second semester. Mr. Harmon

Hist. 217. America as a World Power (3).

The results of the Spanish-American War; the United States' Pacific possessions; Theodore Roosevelt and world affairs; Knox and "Dollar Diplomacy"; the European War I; the American Neutrality; the United States as a belligent; the treaty of Versailles. Not given in 1944. Summer session. Mr. Harmon

Hist. 218. America as a World Power (3).

The United States and the League; the reconstruction of Europe; the rise of Hitler; the World War II; the Monroe Doctrine; the Good Neighbor policy; the problems of the Pacific: China and Japan; Japan and the United States; the War with Japan. Not given in 1944. Summer session. Mr. Harmon

Hist. 227. Research Methods in the Social Sciences (3).

Technique of research along the lines of historical method. Training in the critical handlings of documentary materials, in measuring the value of evidence, and in formal presentation of the results of research. Required of all graduate students in history and government. Open to seniors by permission. Not given in 1944-45. First semester. Mr. Gipson

Hist. 228. Research Methods in the Social Sciences (3).

The emphasis will be placed in this course upon historiography. Not given in 1944-45. Second semester. Mr. Gipson

Hist. 241. Pennsylvania History, 1683-1765 (3).

Various aspects of eighteenth century Pennsylvania history, such as the evolution of the institutions of government, the relations of the settlers to the proprietors, the land policy, the Indian policy, the relations of the various racial groups and religious groups toward one another and toward the provincial government, the relations of Pennsylvania and her colonial neighbors. Not given in 1944. Summer session. Mr. Gipson

Hist. 242. Pennsylvania History, 1765-1787 (3).

Revolutionary movement in provincial Pennsylvania; Pennsylvania at war; the fate of the Pennsylvania loyalists; experiments in constitution-making. Not given in 1944. Summer session. Mr. Gipson

Hist. 243. Pennsylvania History, 1787-1860 (3).

Constitutional, political, economic, and social aspects of the history of the commonwealth within the new Federal Union. Not given in 1944. Summer session. Mr. Gipson and Mr. Harmon

Hist. 261. Seminar in International Relations (3).

Intensive analysis of selected forces and problems of world politics, including forms of political organization; imperialism; nationalism; limitation of armaments; the munitions industry; propaganda; censorship;

pacific settlement of disputes; renunciation of war; collective security; geo-politics; natural resources; markets; trade and tariffs; currency exchange; communications; debts; foreign investments; and population pressure. Not given in 1944-45. First semester. Mr. Godshall

Hist. 262. Seminar in International Relations (3).

Continuation of Hist. 261. Not given in 1944-45. Second semester. Mr. Godshall

GOVERNMENT

Govt. 1. The Foundations of Government (3).

A survey of the basic problems of governmental organization and operation with emphasis upon the controversial issues involved and the relevant political institutions and practices, both contemporary and past, of American, European, and Asiatic peoples. First and second semesters.

Govt. 51. Government of the United States (3).

The evolution of the Federal Government; constitutional principles; machinery of government; citizenship and immigration; emphasis upon the experiences of the American people in their dealings with government and upon the practical workings of that government. First semester.

Govt. 52. State Government in the United States (3).

The position of the states in the union; machinery and activities of state governments; individual rights; the police power; instruments of popular control; the various forms of local government. Second semester.

Govt. 61. Diplomacy (3).

Scrutiny of the methods and objectives of diplomacy with particular emphasis upon illustrative documentary materials portraying negotiations and policies as actually pursued by statesmen striving for position and power. First semester.

Govt. 62. International Relations (3).

Attention is focused upon the basic factors contributing to contemporary friction; elements of international cooperation in dealing with piracy, counterfeiting, narcotics, extradition; trade and communications; protection of life and property; population and minorities problems; colonies and mandates; balance of power; international organization; post-war order. Second semester.

For Advanced Undergraduates and Graduates

Govt. 151. The American Constitutional System (3).

The constitutional basis of American government with emphasis upon the principles of the federal system, the organization and powers of the national government, and the relation of the government to the individual in such matters as the protection of persons accused of crime, the protection of contracts, and due process of law. Summer session. Mr. Schulz

Govt. 157. Municipal Government (3).

The machinery and processes of municipal government in the United States; city-state relations, the government of metropolitan areas; the forms of city government, proportional representation. Special emphasis upon the working of the council-manager plan. First semester. Mr. Schulz

Govt. 158. Municipal Administration (3).

Examination of the fundamental principles of effective administration; a survey of such municipal problems as city planning, health control, urban transportation, police and fire protection, water supply, and waste collection and disposal. Second semester. Mr. Schulz

Govt. 161. International Law (3).

Consideration of the rules governing the conduct of states in their relations with one another in time of peace. Not given in 1944-45. First semester. Mr. Godshall

Govt. 162. International Law (3).

Continuation of Govt. 161. The rules governing relations between states in the event of war. Not given in 1944-45. Second semester. Mr. Godshall

Govt. 163. Contemporary Political Thought (3).

Analysis of the basic concepts of political science; state, government, sovereignty, law, liberty, rights; consideration of authoritarian and popular government; presidential and parliamentary systems. First semester. Mr. Schulz

Govt. 164. Contemporary Political Thought (3).

Theories concerning the proper role of the State in society and the ethical justification of political coercion; the political aspects of anarchism, communism, socialism, fascism, and political pluralism. Second semester. Mr. Schulz

For Graduates

Govt. 263. Seminar in Political Theory (3).

Consideration of theories concerning the nature of the State, its origin, and its role in society. Prerequisites: Govt. 163, 164. Not given in 1943-44. First semester. Mr. Schulz

Govt. 264. Seminar in Political Theory (3).

A continuation of Govt. 263. Prerequisites: Govt. 163, 164, 263. Not given in 1943-44. Second semester. Mr. Schulz

INDUSTRIAL ENGINEERING

See Mechanical Engineering

ITALIAN

See Romance Languages

JOURNALISM

See English

LATIN

PROFESSOR WRIGHT, ASSISTANT PROFESSOR McDONALD

Lat. 1a. Latin (3).

For freshmen who enter with four years of high school Latin. PLINY, selected letters. CICERO, selected letters. Development of letter writing among the Romans and its influence on modern literature. Prerequisite: four years of high school Latin. First semester.

Lat. 1b. Latin (3).

For freshmen who enter with three units of Latin. VERGIL. *Bucolics* and the *Æneid* I-VI, or selections from OVID. Practice in reading aloud and scansion; training in sight translation; the mythology and religion of Greece and Rome; the influence of Latin poetry upon English literature. Prerequisite: three units of high school Latin. First semester.

Lat. 2. Horace (3).

Selected Odes. Lectures on the history and development of lyric poetry; constant practice in reading the more important lyric meters; memorizing of stanzas and passages. Prerequisite: Lat. 1a or 1b. Second semester.

Lat. 4. Livy (3).

Selections from earlier books. Some study of early Roman history and topography. CATULLUS, selected poems. Prerequisites: Lat. 1 and 2. First or second semester.

Lat. 11. English Words Derived from the Latin (3).

Intended to give the students some familiarity with those Latin words that have contributed most largely in derivatives to the English language and to teach the intelligent use of the English dictionary. Elective for all students; no previous knowledge of Latin required. Not given in 1943-44. First semester.

Lat. 13. Latin Drama (3).

Drama among the Romans; native dramatic performances; indebtedness to Greek drama; the various dramatic forms and their vogue; chief writers; dramatic festivals; the Roman theater; influences in later literature. Reading of selected plays of Plautus, Terence, and Seneca. Prerequisite: Lat. 2. First or second semester.

Lat. 21. Ancient History (3).

The development of civilization from Paleolithic times to the world empire of Alexander the Great. The first six weeks are assigned to the Stone Age, the Oriental nations, and the Minoan civilization; the remainder of the semester to Hellenic Greek, Political history; the social, economic, religious, philosophic, artistic, and literary development of the ancient world; the origin of political institutions. First semester.

Lat. 22. Ancient History (3).

Continuation of Lat. 21. The Hellenistic Age. Rome from its origin to 395 A.D. Second semester.

Lat. 23. Roman Law (3).

Preliminary lectures on laws and customs of peoples anterior to the rise of Roman law. The development of Roman law from the *Leges Regiae* to the codification of Justinian. The influence of Roman law on modern nations. Reading of select portions of the law, comparing them with modern law. Prerequisite: sophomore standing. Not given in 1943-44. First or second semester.

Lat. 24. Roman Political Institutions (3).

The political institutions established and developed at Rome from the earliest times to the reign of Diocletian. A description and historical survey of political life at Rome and in its provinces by means of lectures, assigned reading, and special reports. Consideration of the titles and duties of state officials during the regal period, the republic, and the empire. Prerequisite: sophomore standing. Not given in 1944-45. First or second semester.

Lat. 31. Beginning Latin (3).

Special emphasis on English derivations and the principles of grammar. First semester.

Lat. 32. Cæsar (3).

The Gallic War. Books I-IV. Prose composition and syntax. Second semester.

Lat. 33. Cæsar (3).

Selections from the later books of the *Gallic War* or from the *Civil War.* Prose composition and syntax, with emphasis on clause construction. For students who enter with two years of high school Latin and who elect to continue Latin. Prerequisite: two years of high school Latin. First semester.

Lat. 34. Cicero (3).

Orations. Continuation of Lat. 33. Essays: *de Senectute* or *de Amicitia* Prerequisite: Lat. 33. Second semester.

Lat. 84. The Economic and Social Life of the Romans (3).

A general survey of Roman life under the following headings; commerce, trade, industrial and domestic arts, agriculture, religion, athletics, amusements, warfare, medicine and surgery, education, marriage and funeral customs, costume, houses, and furniture. Lectures, collateral readings and report. Prerequisite: *consent of the instructor.* Not given in 1944-45. Second semester.

For Advanced Undergraduates and Graduates

Lat. 105. Satire (3).

Selected satires of Horace and Juvenal. Lectures on the history of Roman satire and its influence on modern literature. Study of social conditions under the empire. Prerequisites: Lat. 13 and 4. First semester.

Mr. Wright

Lat. 106. Roman Prose Writers of the Empire (3).

Selections from the following: Petronius, *Cena Trimalchionis;* Apuleius, Cupid and Psyche story from the *Metamorphoses;* Suetonius, *Lives;* Seneca, *Moral Epistles* and *Dialogues;* Tacitus, *Germania.* Prerequisites: Lat. 13 and 4. Not given in 1944-45 Second semester. Mr. McDonald

Lat. 107. Vergil (3).

Æneid, Books VII-XII. Continuation of Lat. 108. Prerequisites: Lat. 13 and 4. Not given in 1944-45. First semester. Mr. Wright

Lat. 108. Lucretius (3).

The finest literary passages and selected passages illustrating his philosophy. Ennius and some study of early Roman epic. Vergil's sixth *Æneid.* An intensive study of its debt to Greek literature, religion, and philosophy, and its influence on modern literature. Lectures on the history of the epic; collateral reading in the great epics of other literatures. Prerequisites: Lat. 13 and 4. Not given in 1944-45. Second semester.

Mr. Wright

Lat. 109. Latin Prose Composition (3).

Exercises in translating from English into Latin with a collateral study of Latin grammar. Special attention to clause construction and other points of syntax. Students preparing to teach Latin are expected to elect this course. Prerequisites: Lat. 13 and 4. Not given in 1944-45. First or second semester. Mr. McDonald

Lat. 110. The Teaching of High School Latin (3).

Discussion of aims, content, and methods, and of the standard texts used in preparatory school Latin, with a consideration of the report of the Classical Investigation, of Lodge's *Vocabulary of High School Latin,* and of Byrne's *Syntax of High School Latin.* Students preparing to teach Latin are expected to elect this course. Prerequisite: Lat. 4 and 13. Not given in 1944-45. First or second semester. Mr. McDonald

Lat. 121. The Roman Republic (3).

Special emphasis on governmental and social problems of the last two centuries B.C. and the Hellenistic Greek background of the Roman Empire. Prerequisites: Lat. 21 and 22. Not given in 1944-45. First or second semester. Mr. McDonald

Lat. 122. The Roman Empire to the Death of Marcus Aurelius (3).

Special emphasis upon the development of the principate, and upon the social and economic structure of Rome, the provinces, and the municipalities. Prerequisites: Lat. 21, 22, and 121. Not given in 1944-45. Second semester. Mr. McDonald

Lat. 125. Latin Literature in English Translation (3).

A study of Latin literature by means of the best English translation. No knowledge of the Latin language is required. The lives of the most important authors are studied and their works read according to the major departments of literature,—history, comedy, epic, lyric, etc. Emphasis is placed on the chronological development of the literature and historical background necessary to the interpretation of the author's works. Lectures and readings with special reports. Not given in 1944-45. Second semester. Mr. McDonald

Lat. 182. Archaeology of Italy (3).

Neolithic, Terramare, Villanovan, and Etruscan cultures. Rome the City; its buildings, monuments, and streets, its destruction and rediscovery through excavation; origin and growth of the city; the three periods, empire, republic, and kingdom; methods of identifying and dating monuments. A survey of Pompeii, Herculaneum and Ostia. Lectures, readings, and reports. Prerequisite: *consent of the instructor.* Second semester.
Messrs. Wright and McDonald

For Graduates

For admission to graduate courses the student must satisfy the department of his fitness and adequate preparation. It is generally preferred that applicants have completed twenty-four semester hours of undergraduate college Latin in an approved college or university.

Lat. 201. Latin Epigraphy (3).

Text book supplemented by frequent use of the *Corpus Inscriptionum Latinarum* and the standard texts of some of the longer inscriptions, illustrating Roman political institutions, public and private life, and religion. Not given in 1944-45. First semester. Messrs. Wright, McDonald

Lat. 202. Topography and Monuments of Ancient Rome (3).

Lectures (usually illustrated) on the origin, growth, and destruction of ancient Rome and on modern methods of identifying extant monuments. Frequent reports based on a detailed study of the discoveries affecting individual sites. First or second semester. Mr. Wright

Lat. 203. Ovid's Fasti (3).

Substantially the whole of the Fasti. Lectures on the religion of ancient Rome and numerous reports on the various festivals treated in Ovid's poem and its sources. First or second semester. Mr. Wright

Lat. 205. Roman Epic (3).

Lectures on the history of epic poetry. Intensive study of the *Æneid* of Vergil and its sources. Not given in 1944-45. First semester.

Mr. Wright

Lat. 207. Seminar (3).

Intensive study and reports on the text, history, and interpretation of some work chosen from one of the following authors Livy, Ovid, Horace, Vergil, Cicero, Celsus, Quintilian, and Pliny. Not given in 1944-45. First or second semester. Messrs. Wright, McDonald

Lat. 208. Tacitus (3).

Readings of selections, especially from the Annals. The material on Tiberius and Nero will be particularly studied. Collateral work in Suetonius and Cassius Dio. A study of the comparative credibility of Tacitus, Suetonius, and Dio. Frequent reports by students. Not given in 1944-45. First or second semester. Mr. McDonald

Lat. 209. Cicero's Letters (3).

Reading of a large selection of the letters of Cicero. Study of the political and social background of the period. The other works of Cicero will be used to illustrate the letters. Particular attention will be paid to material of value to teachers of Cicero in the secondary schools. Not given in 1944-45. First or second semester. Mr. McDonald

LAW

See Accounting

MATHEMATICS AND ASTRONOMY

PROFESSORS FORT, REYNOLDS, AND SMAIL
ASSOCIATE PROFESSORS LAMSON, SHOOK, AND RAYNOR
ASSISTANT PROFESSORS BEALE, LATSHAW, CUTLER, MEANS, VAN ARNAM AND WEIL
MESSRS. ILLICK, AND KOGBETLIANTZ

The undergraduate major in mathematics in the College of Arts and Science consists of at least thirty semester hours college credit in mathematics. It must include Math. 15 and Math. 106. The twelve hours advanced credit required by the regulations of the college must be from mathematics courses given at Lehigh University other than Math. 1, 1a, 1b, 11, 11a, 12, 13, 14, 15, 16, 20, 23, 24, and 40.

A major in actuarial science is offered within the department of mathematics. The graduate should be able to pass the examinations for associate in the Actuarial Society of America. The major consists of Math. 11, 12, 13, 14, 15, 40, 42, 43, 51, 124, Acctg. 1, 2, Fin. 25, Eco. 3, 4, 107 and 108.

The department of mathematics accepts candidates for the degree of Doctor of Philosophy who wish to specialize in analysis, or mechanics. Persons who are interested should read the general regulations of the Graduate School and consult with the head of the department of mathematics.

To major in mathematics and obtain a master's degree in one year, a graduate student must present evidence of having completed the work required of an undergraduate who majors in mathematics in a Class A American college. Such a major is understood to include at least twelve semester hours of mathematics requiring as a prerequisite one year of calculus. Graduate students who cannot satisfy these requirements but who desire to major in mathematics may take preliminary courses for which they are prepared but cannot expect to complete the requirements for a master's degree in one year.

Math. 1. Plane Trigonometry (3).
First semester.

Math. 1a. Unified Mathematics (3).
This course is designed for freshmen in the College of Arts and Science, particularly those who do not desire to specialize in mathematics. First semester.

Math. 1b. General Mathematics for Students of Business (3).
Review of elementary algebra, graphs and charts, the straight line law, the law of the parabola, logarithms, arithmetic and geometrical progressions, the exponential law, the power law, curve fitting, permutations, combinations, and probability. First and second semesters.

Math. 11. Algebra and Analytic Geometry (3).
Algebra review, theory of equations, approximate solutions of numerical equations; introduction to analytic geometry; differentiation of algebraic functions. Prerequisite: Math. 1 or 1a, or entrance credit in plane trigonometry. First and second semesters.

Math. 11a. Solid Geometry and Analytic Geometry (3).
Essentials of solid geometry with emphasis on mensuration; introduction to analytic geometry; differentiation of algebraic functions. Prerequisite: Math. 1 or 1a, or entrance credit in plane trigonometry. First and second semesters.

Math. 12. Analytic Geometry and Calculus (3).
Conic sections and curve tracing; integration with simple applications. Prerequisite: Math. 11. First and second semesters.

Math. 13. Calculus (3).

Transcendental functions, polar coordinates, extensive drill in the technique of integration, applications. Prerequisite: Math. 12. First and second semesters.

Math. 14. Intermediate Calculus (3).

Partial derivatives; multiple integrals, centroids, moments of inertia, etc.; Taylor's formula. Prerequisite: Math. 13. First and second semesters.

Math. 15. Reading Course in Mathematics (1).

Credit not to exceed one hour per semester, total credit not to exceed three hours; approval of program and written report required. Prerequisite: consent of the head of the department. First and second semesters.

Math. 16. Solid and Spherical Geometry and Spherical Trigonometry (3).

Open to all students, particularly advised for students of astronomy. Given when there is sufficient demand. First semester.

Math. 20. Elementary Mechanics (4).

Composition and resolution of forces, conditions of equilibrium for rigid bodies, friction, work, elementary kinematics, and kinetics. Prerequisite: Math. 1. First and second semesters.

Math. 23. General Mathematics for Students of Business, Second Course (3).

Fundamental ideas of analytic geometry and calculus, and selected topics of algebra, with numerous applications to problems of business and the social sciences generally. Prerequisite: Math. 1b. Second semester.

Math. 24. General Mathematics for Students of Business, Third Course (3).

Continuation of Math. 23. First semester.

Math. 27. Navigation (3).

A study of methods for the determination of the position of a ship at sea and for the determination of the course of the ship to a given destination. Marine navigation; mariner's charts; piloting; the sailings; dead reckoning; spherical trigonometry; great circle sailing; nautical astronomy; correction of observed altitudes; use of the Nautical Almanac and navigation tables; calculation of time, latitude, longitude, azimuth from observations; determination of Sumner lines of position; practice of navigation at sea. Modification of preceding methods for air navigation. Prerequisite: trigonometry.

Math. 40. Mathematics of Finance (3).

Compound interest, an elementary treatment of annuities, etc. Prerequisites: Math. 1a, 1b, or 11. First and second semesters.

Math. 42. Mathematics of Statistics (3).

Prerequisite: Math. 11 or 40. Second semester.

Math. 43. First Course in Mathematics of Life Insurance (3).

Mathematical theory of life contingency; preparation of life and monetary tables; computation of premiums for various life insurance policies; valuation of policies to meet statutory requirements; mathematical theory of risk and cost of insurance; computation of items for annual reports; valuation of life annuities. Prerequisite: Math. 40. First semester.

Math. 51. Advanced Algebra (3).

Complex numbers, theory of equations with applications to classical problems, Sturm's theorem, etc., determinants, and the theory of resultants. Prerequisite: Math. 11. First semester.

Math. 54. Higher Geometry (3).

An introductory course in projective geometry and non-euclidean geometry. Prerequisite: *Math. 13, previously or concurrently.* Second semester.

For Advanced Undergraduates and Graduates

Math. 101. Vector Analysis (3).

The theory and method of vector analysis as applied in physics and pure mathematics. Prerequisite: *Math. 106.* First semester. Mr. Latshaw

Math. 106. Advanced Calculus (3).

Line and surface integrals, elementary differential equations, complex variables, Fourier series, and other selected topics. Prerequisite: Math. 14. First and second semesters. Messrs. Fort, Smail

Math. 111. Differential Equations (3).

Special solvable non-linear equations, linear equations, transformations, and symbolic methods, solutions in series. Riccati's, Bessel's, and Legendre's equations. Prerequisite: Math. 106. First semester. Mr. Shook

Math. 112. Differential Equations and Harmonic Analysis (3).

Continuation of Math. 111. Partial differential equations, Fourier series, and cylindrical and spherical harmonics. Second semester. Mr. Shook

Math. 121. Analytic Mechanics (3).

Differential equations of motion, treatment of forces in space, free and constrained motion of a particle and of masses, with applications to practical problems. Prerequisite: Math. 106. First and second semesters. Mr. Reynolds

Math. 124. Theory of Errors and Least Squares, Empirical Formulas (3).

Probability, least squares and its application in the study of errors. The formation of empirical formulas. Numerical methods. Designed for students engaged in experimental or observational work. Prerequisite: Math. 106. Second semester. Mr. Latshaw

Math. 125. Aerodynamics (3).

Fundamentals of fluid mechanics applied to wing and propeller theory. The Prandtl theory of lift and drag. Principles of similitude with applications to wind tunnel tests. Prerequisites: *Math. 14 and 20.* First semester. Mr. Shook

Math. 126. Aerodynamics (3).

Dynamics of the airplane. Climbing, gliding, and other types of flight. Theory of stability and control in preparation for work in design. Prerequisite: Math. 125. Second semester. Mr. Shook

Math. 128. Exterior Ballistics (3).

The trajectory; air resistance; drag and cross wind coefficients; yaw; stability; equations of motion; computation of trajectories; ballistic and firing tables; rotation of the earth; probability; probability integral; probability of hitting. Prerequisite: *Math. 106 or Math. 125.* Second semester. Mr. Raynor

Math. 140. Higher Algebra (3).

Linear dependence. Linear equations. Theory of matrices and linear transformation. Bilinear and quadratic forms. Theory of invariants. Second semester.

For Graduates

Math. 200. Fundamental Concepts of Mathematics (3).

Summer Session only. Mr. Fort

Math. 209. Mathematics Seminar (3).

Reports on special topics of the literature of mathematics and of individual research. Prerequisite: graduate standing and consent of the instructor. First semester. Messrs. Fort, Reynolds, Smail, Raynor

Math. 210. Mathematics Seminar (3).

Continuation of Math. 209. Second semester.
Messrs. Fort, Reynolds, Smail, Raynor

Math. 211. Infinite Processes (3).

Fundamental limit notions applied to various infinite processes.
Mr. Fort

Math. 212. Infinite Processes (3).

Continuation of Math. 211. Second semester. Mr. Fort

Math. 215. Theory of Functions of a Complex Variable (3).

First semester. Mr. Smail

Math. 216. Theory of Functions of a Complex Variable (3).

Continuation of Math. 215. Second semester. Mr. Smail

Math. 217. Theory of Elasticity (3).

Theory of stress and strain. Tension and thrust with applications. Bending of rods and plates. Equilibrium of curved rods, cylinders, and spheres. First semester. Mr. Reynolds

Math. 218. Theory of Elasticity (3).

Continuation of Math. 217. Second semester. Mr. Reynolds

Math. 219. Selected Topics in Quantum Mechanics and Relativity (3).

Lagrange's equations; Hamilton's partial differential equation; Schrödinger's wave equation with incidental introduction of characteristic functions of second order differential equations; the work of Dirac and others. The relativity part of the course is of the conventional type. First semester. Mr. Lamson

Math. 220. Selected Topics in Quantum Mechanics and Relativity (3).

Continuation of Math. 219. Second semester. Mr. Lamson

Math. 221. Aerodynamics (3).

Hydrodynamics, equations of motion, steady flow around obstacles, vortex theory. Application to wing and propeller theories, lift, and drag. Prerequisite: Math. 126. First semester. Mr. Shook

Math. 223. Differential Geometry (3).

The differential geometry of curves and surfaces. Prerequisite: Math. 106. First semester. Mr. Cutler

Math. 224. Differential Geometry (3).

Continuation of Math. 223. The differential geometry of surfaces and Riemann spaces; tensor analysis. Second semester. Mr. Cutler

Math. 227. Finite Differences and Difference Equations (3).

The calculus of finite differences, the difference equation in the domain of real variables with special reference to the linear recurrent relation, boundary value and oscillation theorems, applications to mechanics and electrical theory. Prerequisite: Math. 106. First semester. Mr. Fort

Math. 228. Linear Difference Equations (3).

Continuation of Math. 227. The linear difference equation in the domain of the complex variable, existence theorems, etc. Prerequisites: Math. 227 and a course in the theory of functions of a complex variable. Second semester. Mr. Fort

Math. 229. Advanced Analytic Mechanics (3).

Conservative and non-conservative fields; generalized coördinates; Lagrange's equations; Hamilton's canonical equations; holonomic and nonholonomic systems; gyroscope motion, etc. Prerequisite: *Math. 121.* First semester. Mr. Raynor

Math. 230. Advanced Analytic Mechanics (3).

Continuation of Math. 229. Second semester. Mr. Raynor

Math. 231. Calculus of Variations (3).

Fundamental existence theorems of analysis. The classical theory of necessary and of sufficient conditions for relative minima of single integrals. Fields of extremals and the Hamilton-Jacobi theory. Numerous physical and mechanical applications and extensions to be chosen according to the special interests of the students. First semester.

Math. 235. Mathematical Methods in Geophysics (3).

Gravitational anomalies and measurements in their relations with tectonic structures and geophysical surveying. Maps of anomalies and the problem of their geological interpretation. Known methods of approximate interpretation with the aid of greatest and least values. New methods of solution by successive approximations based on the use of all observed values simultaneously. For advanced students in geology, mining, physics, and mathematics. One laboratory period (drawing and interpretation of geophysical maps) and two lectures each week. First semester. Prerequisite: *Math. 106.* Mr. Kogbetliantz

Math. 236. Mathematical Methods in Geophysics (3).

Continuation of Math. 235. Magnetic anomalies. Prerequisite: *Math 235.* Second semester. Mr. Kogbetliantz

Math. 241. Theory of Functions of Real Variables (3).

Brief discussion of the real numbers. Continuous functions, semi-continuous functions, functions of bounded variation, and other important classes. The derivative. Modern theory of measure and integration. Important inequalities. Implicit function theorem and other existence theorems of analysis. First semester. Mr. Weil

Math. 242. Introduction to Topology (3).

Elements of point set topology with emphasis on applications to Euclidean spaces and spaces of functions. Combinatorial topology with applications of connectivity. Second semester. Mr. Weil

Math. 250. Modern Algebra (3).

The basic concepts of algebra: groups, rings, fields and linear algebras. The structure of finite groups, including isomorphism and the Jordan-Hölder Theorem. Galois theory of equations. Applications to special problems. Second semester. Mr. Weil

ASTRONOMY

The undergraduate major in mathematics and astronomy consists of at least twenty-four semester hours college credit in mathematics and astronomy. It must include Math. 1 (or 1a), 11, 12, 13, 14 and Astr. 2 and 3, except that students having entrance credit in plane trigonometry do not take Math. 1. The twelve

hours advanced credit required shall not include Math. 1, 1a, 11, 12, 13, 14, 15, 16, 20, 40 or Astr. 1.

Astr. 1. Descriptive Astronomy (3).

The earth as an astronomical body, the solar system, a brief introduction to sidereal astronomy. First and second semesters.

Astr. 2. General Astronomy (3).

The solar system, the sidereal system with an introduction to celestial mechanics and astrophysics. Prerequisite: Math. 13. Second semester.

Astr. 3. Practical Astronomy (3).

Instruments used: methods of taking and reducing observations to determine time, latitude, and azimuth, observatory work in which each student makes his own observations and computations in illustration of the theory studied. Prerequisites: Astr. 2, Math. 14. First semester.

MECHANICAL ENGINEERING AND INDUSTRIAL ENGINEERING

PROFESSORS F. V. LARKIN, KLEIN, BUTTERFIELD, AND STUART
ASSISTANT PROFESSOR JACKSON
MESSRS. FORSTALL, ASKREN, DEIFER, WERNICK, GROSS, AND ST. CLAIR

MECHANICAL ENGINEERING

M.E. 1. Elementary Machine Design (3).

Graphical statics of mechanisms and elementary strength of materials. Prerequisites: *Freshman Math., Phys., and Drawing.* First and second semesters.

M.E. 2. Elementary Heat Engines (3).

Elementary thermodynamics, properties of steam, power plant auxiliaries, heat engine cycles, fuels, boilers, steam engines, steam turbines, internal combusion engines. Prerequisites: *Freshman Math., Phys., and Chemistry.* First and second semesters.

M.E. 4. Elementary Machine Design (3).

Continuation of M.E. 1 with kinematics and design calculations for simple machine elements such as cams and gears. Prerequisite: *Freshman Math., Phys., and Drawing.* Second semester.

M.E. 5. Heat Engines (3).

Continuation of M.E. 2. Prerequisites: *Freshman Math., Phys., and Chemistry.* Second semester.

M.E. 9. Engineering Laboratory (1).

Use and calibration of instruments; elementary tests on steam engines, pumps, and boilers. Prerequisite: *M.E. 2.* Fee, $6.00. First semester.

M.E. 11. Engineering Laboratory (1).

Continuation of M.E. 9. Laboratory experiments of flow of fluids, tests of steam engines, turbines, and compressors, heat transfer equipment, internal combustion engines. Prerequisite: *M.E. 2.* Fee, $6.00. Second semester.

M.E. 15. Thesis (3).

Candidates for the degree of B.S. in M.E. may, with the approval of the department staff, undertake a thesis as a portion of the work during the senior year. Prerequisites: *C.E. 32, M.E. 33.* First or second semester.

M.E. 19. Engineering Laboratory (1).

A one semester course for non-mechanical students, covering principles of measurements, tests of boilers, steam engines, steam turbines, air compressors, internal combustion engines. Prerequisite: *M.E. 2, or equivalent.* Fee, $6.00. First and second semesters.

M.E. 21. Engineering Laboratory (1).

For non-mechanical students. Use and calibration of instruments, tests of steam engines, steam turbines, boilers, and compressors, internal combustion engines, pumping equipment. Prerequisite: *M.E. 22 or equivalent.* Fee, $6.00. First semester.

M.E. 22. Heat Engines (3).

For non-mechanical students. Fuels, combustion, engineering, thermodynamics, properties of steam, steam power plant equipment and cycles, internal combusition engines. Prerequisites: *Math. 13 and Phys. 23 previously or concurrently.* First semester.

M.E. 23. Heat Engines (3).

Continuation of M.E. 22. Prerequisites: *Math. 13 and Phys. 23 previously or concurrently.* Second semester.

M.E. 25. Engineering Laboratory (1).

Continuation of M.E. 21. Prerequisite: *M.E. 22 or equivalent.* Fee, $6.00. Second semester.

M.E. 29. Heat Engines (3).

A one semester course for non-mechanical students. Combustion, properties of steam, power plant equipment, internal combustion engines. Prerequisite: *Math 13 and Phys. 23 previously or concurrently.* First and second semesters.

M.E. 33. Thermodynamics (2).

Energy operations, entropy, flow of fluids, power plant cycles, application of principles to steam power equipment and to compressors. Prerequisite: *M.E. 2 or equivalent.* First and second semesters.

M.E. 35. Internal Combustion Engines (2).

Thermodynamics of internal combustion engine cycles, spark and compression ignition engines, carburetion, fuel injection, special problems of the Diesel engine. Prerequisite: *M.E. 5.* Second semester.

M.E. 40. Machine Design (3).

Strength and kinematics in the design of machine elements including fastenings, springs, flywheels, and gears. Elementary study of vibration and balancing. Prerequisite: *M.E. 1.* First and second semesters.

For Advanced Undergraduates and Graduates

Graduate students desiring to take the following courses should present as prerequisites: integral calculus, mechanics of materials, and elementary heat engines.

M.E. 100. Theoretical Naval Architecture (3).

Ship lines, displacement, buoyancy, stability, coefficients. Froude's law of model testing. Taylor's standard series, speed and power of ships. Prerequisite: *senior standing in engineering.* Second semester. Mr. Stuart

M.E. 114. Engineering Laboratory (2).

Comprehensive tests of power plant equipment, internal combustion engines, refrigeration machinery. Prerequisite: *M.E. 9.* Fee, $6.00. First semester. Messrs. Stuart, Jackson

M.E. 116. Mechanics of Compressible Fluids (3).

Study of the behavior of real fluids. Physical properties of fluids, viscosimetry. Laws of dynamic similitude and use of dimensionless parameters. Laminar and turbulent flow. Flow of compressible fluids through pipes, orifices and curved channels, lubrication and heat transfer. Prerequisite: *senior or graduate standing in engineering.* Second semester.
Messrs. Stuart, Jackson

M.E. 117. Air Conditioning and Refrigeration (3).

Application of thermodynamics to fields of refrigeration, air conditioning, heating, ventilating. Study of typical systems. Advanced work in heat transfer and flow of fluids. Prerequisite: *M.E. 33.* First semester.
Messrs. Klein, Forstall

M.E. 118. Engineering Laboratory (2).

Continuation of M.E. 114 supplemented by complete tests of power plants in the vicinity and original investigations. Prerequisite: *M.E. 9.* Fee, $6.00. Second semester. Messrs. Stuart, Jackson

M.E. 119. General Aeronautics (3).

A theoretical course in aeronautics, including aerodynamics of the airplane and propeller, also navigation and navigating instruments. Prerequisite: *senior standing in the college of engineering.* First semester.
Messrs. Butterfield, Jackson

M.E. 120. Aeronautical and Automotive Engines (3).

Thermodynamic and mechanical design features, carburetors, superchargers, and accessories, air and liquid cooling, spark and compression ignition; performance under varying operating conditions. Prerequisite: *senior standing in the College of Engineering; M.E. 33 or equivalent.* Second semester. Messrs. Butterfield, Jackson

M.E. 121. Advanced Machine Design (3).

Vibration and balancing of machines, advanced strength of materials, elementary study of lubrication. Prerequisites: *M.E. 40, C.E. 32.* First semester.

M.E. 122. Advanced Machine Design (3).

Advanced problems in machine design. Prerequisites: *M.E. 40, C.E. 32.* Second semester.

M.E. 123. Power Plants (3).

A study of the relation of the various pieces of power plant equipment to each other. Calculations for the design of power plant elements. Comparison of different types of plants driven by both steam and internal combustion engines. Utilization of exhaust heat. Prerequisite: *M.E. 33 or equivalent.* Second semester. Messrs. Klein, Jackson

M.E. 125. Air Conditioning (3).

Continuation of M.E. 117. Advanced work in the field of air conditioning. Design of typical systems based on fundamental laws of heat transfer and fluid flow. Study of automatic methods of controlling temperature and humidity. Classroom and laboratory work. Prerequisite: *M.E. 117 or equivalent.* Second semester. Messrs. Klein, Forstall

M.E. 134. Plant Proseminar (1).

Proseminar covering the material of M.E. 114, concerned primarily with trips to industrial plants and discussions of mechanical processes and equipment. Prerequisite: *M.E. 9.* First semester.

Messrs. Larkin, Stuart

M.E. 138. Plant Proseminar (1).

Continuation of M.E. 134 but covering the material in M.E. 118. Prerequisite: M.E. 9. Second semester. Messrs. Larkin, Stuart

M.E. 141. Machine Analysis Laboratory (1).

Laboratory balancing of rotating equipment; stroboscopic study of machine operation; studies in suitability of materials. Prerequisite: *M.E. 40.* First semester.

Students taking any of the courses in engineering laboratory are subject to call for one twenty-four hour test a semester.

For Graduates

Math. 217 and 218, Theory of Elasticity, Math. 221, Aerodynamics, and E.E. 217 and 218, Economics of Electric Power, may be included in a graduate major in mechanical engineering.

M.E. 200. Advanced Engineering Thermodynamics (3).

Energy equations; availability and entropy; general equations; formulation of vapor properties; action of steam in nozzles and turbines; supersaturation, gas properties; gas reactions in combustion. Prerequisite: *graduate standing in engineering.* First semester. Messrs. Klein, Stuart

M.E. 201. Advanced Engineering Thermodynamics (3).

Continuation of M.E. 200. Prerequisite: *graduate standing in engineering.* Second semester. Messrs. Klein, Stuart

M.E. 203. Internal Combustion Engines (3).

History: laws of mixing, carburetion, atomization, combustion, and chemical equilibrium; heat losses; friction losses; governing; gas engine cycles; vibration and balancing; engine types. Prerequisite: *graduate standing in engineering.* First semester Mr. Butterfield

M.E. 204. Internal Combustion Engines (3).

Continuation of M.E. 203. Prerequisite: *graduate standing in engineering.* Second semester. Mr. Butterfield

M.E. 207. Steam Turbines (3).

Theory of the steam turbine; classification; discussion of types; operation and governing; principles underlying the design of turbine parts; critical velocities: Prerequisite: *graduate standing in engineering.* First semester. Mr. Klein

M.E. 208. Steam Turbines (3).

Continuation of M.E. 207. Prerequisite: *graduate standing in engineering.* Second semester. Mr. Klein

M.E. 211. Advanced Engineering Laboratory (3).

Original investigations and advanced testing in the field of mechanical engineering preceded by a study of the methods of precision measurements required. Prerequisites: *graduate standing in engineering, courses in engineering laboratory and thermodynamics.* Fee, $6.00. First semester. Messrs. Stuart, Jackson

M.E. 212. Advanced Engineering Laboratory (3).

Continuation of M.E. 211. Prerequisites: *graduate standing in engineering, courses in engineering laboratory and thermodynamics.* Fee, $6.00. Second semester. Messrs. Stuart, Jackson

M.E. 216. Advanced Mechanics of Compressible Fluids (3).

Boundary layer theory. Action of compressible fluids in compressors, fans, steam turbines, and other mechanical equipment. Heat transfer and lubrication. Prerequisite: *M.E. 116 or equivalent.* Second semester. Messrs. Stuart, Jackson

INDUSTRIAL ENGINEERING

I.E. 1. Industrial Employment.

Following the junior year, students are required to do a minimum of eight weeks of practical work, preferably as student apprentices, in the work they plan to follow after graduation. A report, typewritten and bound, is required. Prerequisite: *sophomore standing.* Not offered in 1943-44.

I.E. 2. Industrial Management (3).

A course in the essential problems of organizataion, financial administration, plant layout, production control, and employment policies of industrial enterprises. Prerequisites: *Eco. 3 and 4.* First semester.

I.E. 3. Industrial Management (3).

Continuation of I.E. 2. Prerequisites: *Eco. 3 and 4.* Second semester. In I.E. 2 and I.E. 3 a maximum of three half-days inspection trips a semester is required.

I.E. 5. Thesis (3).

Candidates for the degree of B.S. in Industrial Engineering may, with the approval of the department staff, undertake a thesis as a portion of the work of the senior year. Prerequisites: *C.E. 32, Acctg. 4.* First and second semesters.

I.E. 13. Industrial Engineering (3).

A study of the engineering and economic problems arising in manufacturing industries. Lectures, problem exercises, trips, and collateral reading. Prerequisites: *Eco. 3, M.E. 1, and M.E. 5.* First and second semesters.

For Advanced Undergraduates and Graduates

I.E. 111. Industrial Administration (3).

A management study of the industrial organization, its formation, duties, authority, responsibility and control. Lectures and drawing room problems or proseminar. Prerequisite: *I.E. 13.* First semester.

Mr. Larkin

I.E. 112. Personnel Administration (3).

A management study of the personnel organization, its employment, training, safety and reward. Lectures and drawing room problems or proseminar. Prerequisite: *I.E. 13 or equivalent.* Second semester.

Mr. Larkin

I.E. 121. Experimental Industrial Engineering (3).

Experimental projects in selected fields of Industrial Engineering approved by the instructor. A written report is required. Prerequisites: *senior standing in Industrial or Mechanical Engineering, I.E. 13, and consent of the instructor.* Mr. Larkin

I.E. 122. Experimental Industrial Engineering (3).

Continuation of I.E. 121. Prerequisites: *senior standing in Industrial or Mechanical Engineering, I.E. 13, and consent of the instructor.*

Mr. Larkin

For Graduates

Candidates for the degree of Master of Science with a major in industrial engineering may include in their program graduate courses in engineering and psychology for which they have the necessary prerequisites: also Math. 217, 218, 221. The major must include a minimum of twelve hours of graduate courses

in technical engineering, at least six of which must be in industrial engineering. A thesis may be required. The collateral work will normally be taken in the College of Business Administration.

I.E. 200. Management Policies (3).

Analysis of the factors entering into the determination of management policies. Discussion of case material bearing upon the organization, location, growth, size, socialization, and control of types of industries. Prerequisite: *elementary courses in industrial management.* First semester.

Mr. Larkin

I.E. 201. Personnel Policies (3).

Analysis of the factors entering into the determination of personnel policies. Discussion of case material bearing on the worker and his relation to industry, selection, health, training, safety, wages, welfare, and retirement. Prerequisite: *six hours in industrial management.* Second semester.

Mr. Larkin

METALLURGICAL ENGINEERING

PROFESSORS DOAN, STOUGHTON, AND BUTTS
ASSISTANT PROFESSOR FRYE
MR. STOUT

Met. 2. Metallurgy of Iron and Steel (2).

Same as Met. 52, but without plant visits or laboratory exercises. Prerequisites: Met. 21 or 7. Second semester.

Met. 3. Metallurgy of Copper, Lead, and Associated Metals (2).

Same as Met. 53, but without plant visits or laboratory work. Prerequisites: Met. 21 or 7. First semester.

Met. 7. Introduction to Metallurgy (2).

The history and principal modern processes of metallurgy. Ores, fuels, combustion, pyrometry, refractories, welding, and furnaces. Lectures, laboratory exercises, and plant visits. Prerequisites: Chem. 1 or 3, Phys. 22. Fee, $5.00. First semester.

Met. 8. Introduction to Metallurgy (2).

Continuation of Met. 7. The application of physics and chemistry to the principal metallurgical operations. Lectures and metallurgical problems. Prerequisite: Met. 7.

Met. 21. Engineering Metallurgy (2).

An abridgment of Met. 7, 52, 53, and 54, especially adapted to the viewpoint of users of metals. Prerequisites: Chem. 1 or 3, Phys. 22. First and second semesters.

Met. 33. Metallurgical Laboratory (1).

The internal structure and properties of metals and industrial alloys; effect of cold working and heat treatment. Welding. Use of instruments and apparatus employed in metallurgical work. Prerequisites: Phys. 23 and 24, Met. 21, previously or concurrently. Fee, $5.00. First semester.

Met. 34. Metallurgical Laboratory (1).

Continuation of Met. 33. Prerequisites: Phys. 23 and 24, Met. 7 or 21, previously or concurrently. Fee, $5.00. Second semester.

Met. 49. Summer Work.

At the end of the junior year students in the curriculum of metallurgical engineering who do not take Mil. 9 or 19 are required to secure in industrial plants at least eight weeks' practical experience. Not offered in 1943-44.

Met. 52. Metallurgy of Iron and Steel (3).

Chemical and physical properties of iron and steel. Manufacturing processes. Lectures and daily questions on text book, plant visits, and laboratory exercises. Prerequisites: Met. 7 or 21. Fee, $5.00. Second semester.

Met. 53. Metallurgy of Copper, Lead, and Associated Metals (3).

Production processes and properties of copper and its alloys, lead and its alloys, gold, silver, platinum, selenium and tellurium, bismuth. Lectures, written exercises on textbook assignments, plant visits and laboratory work, with formal written reports thereon. Two- or three-day inspection trip (expense about $10.00) is required. Prerequisite: Met. 7 and 8 or 21. First semester.

Met. 54. Metallurgy of Zinc, Aluminum, and the Minor Metals (2).

Production processes and properties of aluminum and its alloys, zinc, tin, nickel, gold, silver, mercury, antimony, etc. A one-day inspection trip (expense about $3.00) is required. Prerequisite: Met. 7 and 8, or 21. Second semester.

Met. 62. Problems in Iron and Steel Metallurgy (1).

A course of problems involving the fundamental principles of the various processes in the metallurgy of iron and steel to give the student an understanding of the quantitative relationship in the processes. Prerequisites: *Met. 52 or 21, previously or concurrently; Met. 8 or 81.* Second semester.

Met. 81. Short Course in Metallurgical Engineering Problems (1).

An abridgement of the problem work of Met. 8 and 62. Prerequisites: *Chem. 8; Met. 7 or 21, previously or concurrently.* First and second semesters.

Met. 91. Thesis in Metallurgy (3).

Candidates for the degree of B.S. in Metallurgical Engineering may, with the approval of the head of the department, undertake a thesis as a portion of the work during the senior year. Deposit, $10.00. First or second semester.

For Advanced Undergraduates and Graduates

Met. 108. Electrometallurgy (3).

The practical application of electricity to metallurgical processes; electroplating and electric furnace plants and practice. Lectures and laboratory work. Prerequisites: *Met. 7 or 21;* Met. 8 and 125. Second semester.
Mr. Butts

Met. 125. Electrochemistry and Electrometallurgy (2).

Lectures and written recitations concerning current and voltage in electrolysis, energy relations, electrode reactions, primary cells and storage batteries; electric furnaces, and practical applications of electricity to metallurgical processes. Prerequisites: Chem. 20, Met. 7 or 21, Phys. 24. First semester. Mr. Butts

Met. 130. Physical Metallurgy (3).

The states of matter; physical structure and constitution of metals; X-rays and crystal structure; effect thereon of mechanical working, heat treatment and composition. Casting, shaping, welding, and testing metal objects. Lectures and laboratory work. Prerequisites: *Chem. 1 or 8, Phys. 22;* Met. 7 or 21. Fee, $5.00. Second semester. Mr. Frye

Met. 131. Metallography (3).

Internal structures of alloys and the constitutional diagram. The relation between structure and properties in industrial alloys. Quenching and aging. Lectures, problems, and laboratory experiments. Prerequisites: *Chem. 1 or 3, Phys. 22;* Met. 7 or 21, and 130. Fee, $5.00. First semester. Mr. Doan

Met. 135. Electrochemical Laboratory (1).

Quantitative relations in the deposition of metals by electrolysis. Experimental study of the conditions controlling the nature of electrolytic deposits, electrolysis of fused salts, cathodic and anodic reactions. Prerequisites: Chem. 36, Met. 7 or 21, Phys. 24, Met. 125, previously or concurrently. Fee, $5.00. First semester. Mr. Butts

Met. 139. Metallurgical Colloquium (1).

An opportunity for the student to develop (1) an acquaintance with the current metallurgical literature, (2) the ability to interpret it clearly, and (3) skill in presenting oral engineering reports. Prerequisite: *Met. 7 or 21;* Met. 52 and 130. First semester. Mr. Doan

Met. 140. Metallurgical Colloquium (1).

Continuation of Met. 139. Prerequisites: Met. 139. Second semester.
Mr. Doan

Met. 152. Advanced Metallurgy of Iron and Steel (3).

Continuation of Met. 52, for seniors and graduate students. Lectures, plant visits, laboratory exercises, written reports. Prerequisite: Met. 52. Second semester. Mr. Stout

Met. 153. Advanced Metallurgy of Iron and Steel (1).

Prerequisites: Met. 52 and the approval of the department head. First and second semesters. Mr. Stout

Met. 154. Advanced Metallurgy of Iron and Steel (1).

Prerequisites: Met. 52 and the approval of the department head. First or second semester. Mr. Stout

Met. 163. Problems in the Metallurgy of Copper, Lead, Gold, and Silver (1).

A course of problems concerned with the principles utilized in the metallurgy of copper, lead, silver, and gold. Prerequisites: *Met. 8 or 81, and 53, previously or concurrently;* Met. 62. First semester. Mr. Butts

Met. 164. Problems in the Metallurgy of Zinc, Aluminum, and the Minor Metals (1).

A course of problems concerned with the principles utilized in the metallurgy of zinc, aluminum, etc. Prerequisites: *Met. 8 or 81, and 54, previously or concurrently;* Met. 62 and 163. Second semester. Mr. Butts

Met. 176. Elective Projects in Metallurgy (3).

An opportunity for the advanced student to undertake an independent investigation in a metallurgical field of his own choice. Assistance will be given only when the student requests it. The project may be either a comprehensive literature investigation, a theoretical study, or one involving laboratory experiment. The project must receive approval of the department before work is begun. First semester.

Messrs. Doan, Stoughton, Butts, Frye, Stout

Met. 177. Elective Projects in Metallurgy (3).

Continuation of Met. 176. Second semester. Mr. Doan

For Graduates

NOTE: Not all of the courses listed below will be given in any one year. Those to be given will be determined by the number of applicants at the beginning of the semester; if the number is less than six, the course may be omitted.

Met. 201. Metallurgical Investigation and Thesis (4-6).

Investigation of some special metallurgical problems, such as: an improvement or innovation in some metallurgical process; the establishment of an equilibrium diagram; the effect of heat treatment on a metal or alloy. Study of the literature. The study and investigation must be embodied in a written report. Prerequisite: undergraduate metallurgical course in the field of investigation. First and second semesters.

Messrs. Doan, Stoughton, Butts

Met. 202. Metallurgical Investigation and Thesis (3).

Continuation of Met. 201. First and second semesters.

Messrs. Doan, Stoughton, Butts

Met. 203. Advanced Electrometallurgy (3).

Specialized study in some particular field of electrochemistry or electrometallurgy selected by the student, such as electrode reactions, thermodynamics of electrolysis, electroplating, electrolytic refining, electrothermics, electrothermal efficiencies, industrial processes. Prerequisite: Met. 125. First and second semester. Mr. Butts

Met. 205. Non-ferrous Metallurgy (3).

Detailed study of the metallurgy of any one or more of the non-ferrous metals, including historical evolution, reading of references on modern practices, and theoretical consideration of the possibilities of future development in manufacture or use. Both chemical and physical metallurgy of the alloys may be included. Prerequisite: a course in non-ferrous metallurgy. First or second semester. Mr. Butts

Met. 208. The Phase Rule (3).

Heterogeneous equilibria in binary and ternary alloy systems in the light of the phase rule. Construction and interpretation of ternary constitutional diagram models. Prerequisites: Met. 131, facility in reading German. First or second semester. Mr. Doan

Met. 209. The Metallic State (3).

Advanced studies of the states of aggregation in metals, of the properties of metallic crystals and crystal aggregates and the effects upon them of deformation, temperature, and pressure. Prerequisites: Met. 130, facility in reading German. First or second semester. Mr. Frye

Met. 210. The Physical Chemistry of the Metals (3).

The principal fields of physical chemistry in their relation to the extraction of metals from their ores, the refining, alloying, heat treatment, welding, coating and corrosion of metal systems. Prerequisites: one undergraduate course in physical chemistry; and elementary ferrous on nonferrous metallurgy, or Met. 130 and 131; facility in reading German. First or second semester. Mr. Doan

Met. 211. The Principles of Modern Welding (3).

The foundations in scientific principle upon which the welding processes rest; the present limitations of the various processes; the trends in new developments; the engineering, industrial, and commercial aspects of welding. Prerequisite: Met. 130 and 131. First or second semester.

Mr. Doan

Met. 212. Radiography in Principle and Practice (3).

The principles of radiography. X-rays and gamma rays. Industrial practices. Prerequisites: Phys. 122 and Met. 130. First or second semester.

Mr. Doan

Met. 215. Stainless Steels (3).

Special problems relating to the making, rolling, finishing, fabricating, and welding of corrosion resistant and heat resistant alloys of iron with chromium and additional alloying elements commonly used. Equilibrium diagrams of iron and chromium with and without other elements sometimes added to stainless steel, such as nickel, molybdenum, etc. The properties of the different typical alloys and their uses in industry and modern civilization. Prerequisites: ferrous metallurgy; and previously or concurrently, Met. 130, 131, and 152. First or second semester.

Mr. Stoughton

Met. 217. Nickel Steels (3).

Special problems encountered in the making, fabricating, finishing, and welding of the alloys of iron and nickel, and in the utilization of steel scrap containing "residual nickel". Metallography, equilibrium diagrams, and properties. Prerequisites: ferrous metallurgy; and, previously or concurrently, Met. 130, 131, and 152. First or second semester.

Mr. Stoughton

Met. 219. Alloy Steels (3).

Alloy steels other than chromium and nickel, especially alloys with manganese, silicon, molybdenum, vanadium, tungsten. High speed steels, steels for electromagnets and permanent magnets. Ternary and quaternary alloy steels for heat treating, especially for automotive, airplane, and special machinery parts. Prerequisites: ferrous metallurgy; and, previously or concurrently, Met. 130, 131, and 152. First or second semester.

Mr. Stoughton

Chem. 236 and 237, X-ray Research, may be included in a graduate major in metallurgy.

MILITARY SCIENCE AND TACTICS

COLONELS BRABSON, CAPERTON, EASTERDAY; LIEUTENANT COLONEL BOWEN, MAJOR JOHNSON, CAPTAINS PIERCE, AND CAMPBELL, LIEUTENANT FOSTER
MASTER SERGEANT GASDA, STAFF SEGEANTS LINKOUS AND WOCKENFUSS

An infantry unit of the Reserve Officers' Training Corps was established at Lehigh University in September, 1919, and an ordnance unit was established in September, 1925. By action of the trustees and faculty of the University the basic course, military science and tactics, was made a required subject for physically fit freshman and sophomores.

The military courses are conducted under War Department regulations and consist of two years of basic work common to infantry and ordnance, and two years of advanced work along specialized lines. Students are selected to pursue the advanced courses on the basis of their proficiency in leadership and scholar-

ship displayed during the basic course. Selections for the ordnance course are usually confined to students in mechanical, chemical, metallurgical, and electrical engineering, and engineering physics. The number selected for the Advanced courses is limited by War Department funds made available annually.

Provision is made for students electing the advanced courses to substitute them for work which would otherwise be required in their respective curricula. Students who complete the four-year course satisfactorily become eligible for basic training in a branch service school and upon completion of that course become eligible for commissions as second lieutenants in the Officers' Reserve Corps.

Uniforms and equipment are furnished by the government to basic students, but each student must provide suitable shoes. A cash deposit of $25.00 is required, payable at the time of registration and refunded in full upon the return of the property issued by the department. Advanced course students are paid commutation of uniform and subsistence which is more than sufficient to cover the purchase of their officers' uniform and equipment.

Infantry Unit

Mil. 1. Basic Course, First Year (2).

Fundamental military training common to all arms of the service. Theoretical and practical instruction in map reading, marksmanship, military courtesy, military hygiene and first aid, leadership, obligations of citizenship, military history and policy, and military organization. Two recitations and one drill period a week. First semester.

Mil. 2. Basic Course, First Year (2).

Continuation of Mil. 1. Second semester.

Mil. 3. Basic Course, Second Year (2).

Fundamental military training common to all arms of the service. Theoretical and practical instruction in leadership, musketry, automatic rifle, scouting and patrolling, and combat principles of rifle squad and platoon. Students who indicate suitable proficiency in this course are appointed corporals in the R. O. T. C. unit. Two recitations and one drill period a week. First semester.

Mil. 4. Basic Course, Second Year (2).

Continuation of Mil. 3. Second semester.

Mil. 5. Advanced Infantry, First Year (3).

Theoretical and practical instruction in leadership, airplane, photographs, infantry weapons (machine gun, 37 mm. and infantry mortars),

combat principles, rifle and machine gun section and platoon, military administration, defense against chemical warfare, and care and operation of motor vehicles. Students who indicate suitable proficiency in this course are appointed sergeants in the R. O. T. C. unit. Three recitations and one drill period a week. First semester.

Mil. 6. Advanced Infantry, First Year (3).

Continuation of Mil. 5. Second semester.

Mil. 7. Advanced Infantry, Second Year (3).

Theoretical and practical instruction in mechanization and motorization, organized Reserve Corps regulations, military history and national defense policy, combat principles, tactical exercises, map problems, leadership, military law, tanks, anti-aircraft and anti-tank defense, combat intelligence, and infantry signal communications. Students who indicate suitable proficiency in this course are appointed commisioned officers in the R. O. T. C. unit. Upon graduation they are eligible for basic training in an army branch service school. Upon completion of this school, students are appointed second lieutenants in the Infantry Officers' Reserve Corps. Three recitations and one drill period a week. First semester.

Mil. 8. Advanced Infantry, Second Year (3).

Continuation of Mil. 7. Second semester.

Ordnance Unit

Mil. 15. Advanced Ordnance, First Year (3).

Theoretical and practical instruction in leadership, material, ammunition and explosives, current ordnance problems. Organization of the ordnance department, defense against chemical warfare, aerial photographs, and military administration. Students who indicate suitable proficiency in this course are appointed sergeants in the R.O.T.C. unit. First semester.

Mil. 16. Advanced Ordnance, First Year (3).

Continuation of Mil. 15. Second semester.

Mil. 17. Advanced Ordnance, Second Year (3).

Theoretical and practical instruction in leadership, property accounting and ordnance financial procedure, military law, industrial mobilization, current ordnance problems, military history and policy, O. R. C. regulations, and ordnance field service. Students who indicate suitable proficiency in this course are appointed officers in the R.O.T.C. unit and upon graduation they are eligible for basic training in an army branch service school. Upon completion of this school students are appointed second lieutenants in the Ordnance Officers' Reserve Corps. Three recitations and one drill period a week. First semester.

Mil. 18. Advanced Ordnance, Second Year (3).

Continuation of Mil. 17. Second semester.

MINING ENGINEERING

PROFESSOR CALLEN
ASSISTANT PROFESSOR GALLAGHER

Min. 6. Mine Surveying (3).

Forms for notes; surface surveys; determination of true meridian, latitude, and time from observations on Polaris and sun; U. S. public land and mineral land surveys; connecting surface with mine surveys through tunnels, slopes, and shafts; calculation of notes; mine mapping, mine problems; practice in mine surveying. Prerequisite: *C.E. 6a.* Second semester.

Min. 8. Oil Field Practice (2).

Distribution of petroleum and natural gas; valuation of oil lands. Location of wells; development-drilling, production methods. Transportation; storage; fires; avoidable waste, conservation of oil and gas resources. Refining methods; casing-head gasoline. Prerequisites: *Geol. 10, Phys. 23, 24.* Second semester. (Not offered 1944-45).

Min. 10. Fuel Technology (2).

Solid fuels: sampling; proximate and ultimate composition of coals, calorific values, fusibility of ash; classification of coal; carbonization, both low- and high-temperature; gasification of fuel. Prerequisite: *one year of college chemistry.* First semester.

Min. 12. Fuel Technology Laboratory (1).

Coal and gas analysis, calorimetry, pyrometry, testing coals for yield of distillation products at low and high temperatures; extraction of coal by solvents. Prerequisites: *Chem. 36 and 48 or equivalent; Min. 10 concurrently.* Deposit, $10.00. First semester.

Min. 15. Mining Engineering (3).

A survey of the elements of mining engineering for students in curricula other than mining engineering. Prospecting, boring, excavation, support, mining methods, transportation, drainage, ventilation, lighting, mineral preparation. Prerequisite: *junior standing.* Both semesters.

Min. 21. Mining Fundamentals (3).

Methods of prospecting; drilling, explosives, and blasting; tunneling, slope- and shaft-sinking; timbering; machines for cutting and loading. Prerequisites: *Geol. 10, Math. 13, Phys. 24;* C.E. 9 concurrently. First semester.

Min. 22. Methods of Mining (3).

The methods of working bedded and vein deposits with special attention to principles involved in the selection of a mining method and to mechanization. Prerequisite: *Min. 21.* Second semester.

For Advanced Undergraduates and Graduates

Min. 103. Mine Ventilation (3).

A study of mine atmospheres, and gases produced or encountered in mining operations; distribution and control of the ventilating current to meet requirements of safe and efficient operation; mine fires and explosions. Prerequisites: *Min. 22 and C.E. 13.* First semester. Mr. Callen

Min. 104. Haulage, Hoisting, and Pumping (3).

The fundamentals of basic design, selection, and application of equipment for transportation of mineral products from working face to surface plant; sources, control, and disposal of mine water. Prerequisites: *Min. 22, C.E. 13, E.E. 50 and M.E. 29.* Second semester. Mr. Callen

Min. 105. Mine Administration (2).

Mining law; mine organization and management; wage systems and trade agreements; mine safety organization and regulation; special aspects of workmen's compensation laws; personnel administration. Prerequisite: *Min. 22.* First semester. Mr. Gallagher

Min. 106. Mining Economics (3).

Systematic exploration and examination; theory and methods of sampling; reserves; mine taxation; depreciation and depletion; valuation and reports. Prerequisites: *Acctg. 4, Min. 22 and 107.* Second semester. Mr. Callen

Min. 107. Ore Dressing, Coal Preparation and Laboratory (3).

Recovery of minerals from ores; machines and apparatus used for coarse and fine crushing; classifying and preparation for concentration; methods of concentration, including gravity and magnetic methods, flotation, etc. Treatment of ores in concentrating plants; visits to mills; experimental work in ores; principles of concentration applied to the preparation of coal. Visit to breakers and coal washers. Prerequisites: *Geol. 1 or 2, Phys. 23, 24,* Chem. 36, Min. 22. Fee, $5.00. First semester. Mr. Gallagher

Min. 108. Advanced Mineral Preparation (2).

An extension of the study of fundamental theories of mineral preparation begun in Min. 107, with special reference to flotation of metallic and non-metallic minerals; design of flow sheets based on results of laboratory tests. Prerequisites: *Min. 107.* Deposit, $10.00. Second semester.

For Graduates

Students desiring to do graduate work in mining engineering should consult with the head of the department with regard to their qualifications.

Min. 201. Methods of Mining (3).

Study of methods used in a given mining region or in the production of a given class of materials, with respect to conditions influencing choice of method and cost. First semester. Mr. Gallagher

Min. 202. Methods of Mining (3).
Continuation of Min. 201. Second semester. Mr. Gallagher

Min. 203. Mining Plant (3).
The determination of the efficiency of mining machinery of given types under varying conditions. First semester. Mr. Callen

Min. 204. Mining Plant (3).
Continuation of Min. 203. Second semester. Mr. Callen

Min. 205. Ore-Dressing and Coal Washing Plant (3).
Study of operations in dressing ores and preparation of coal. Efficiency of machines and processes. Losses in dressing. Fee, $5.00. First semester. Mr. Gallagher

Min. 206. Ore-Dressing and Coal Washing Plant (3).
Continuation of Min. 205. Fee, $5.00. Second semester. Mr. Gallagher

MORAL AND RELIGIOUS PHILOSOPHY

PROFESSOR BEARDSLEE

As a prerequisite to graduation, the University requires all of its students to take a one-hour course in the basic problems and theories of the philosophy of conduct and the philosophy of religion in order that they may acquire some familiarity with the best thought concerning the moral and spiritual problems of men. The emphasis is continually upon the certainties of knowledge and faith by which men live. The purpose is constructively to help the student to clarify and enrich his own living philosophy of life.

This requirement must be met by satisfactory completion of M.R.Phil. 10. Although this course does not carry semester hour credit toward graduation, the grade received is counted in determining the scholastic average of the student.

The courses listed below as carrying semester hour credit may be chosen as free electives and when so elected carry semester hour credit toward graduation, but none of them may be selected as a substitute for the Moral and Religious Philosophy requirement.

M.R.Phil. 10. Student Philosophy.
Analysis of basic student problems and beliefs in moral and religious experience, in the construction of personal philosophies of conduct and religion. First and second semesters.

M.R.Phil. 12. Philosophy of Conduct (1).

Analysis of such problems as: the terms good and bad, right and wrong; the sources of moral distinctions; responsibility and freedom; progress; happiness. Prerequisite: M.R.Phil. 10. First and second semesters.

M.R.Phil. 13. Philosophy of Conduct (1).

Historical and case study of systems of ethics. First semester.

M.R.Phil. 14. Philosophy of Conduct (1).

Continuation of M.R.Phil. 13. Prerequisite: M.R.Phil. 13. Second semester.

M.R.Phil. 16. Philosophy of Religion (1).

A study of the origin, nature and validity of religious experience. Prerequisite: M.R.Phil. 10. First and second semesters.

M.R.Phil. 17. Comparative Religion (1).

Philosophical study of the source materials and authoritative expositions of living religions in order to orient the student's own convictions in the varieties of effective faith. Prerequisite: M.R.Phil. 10. First and second semester.

M.R.Phil. 18. Comparative Religion (1).

Continuation of M.R.Phil. 17. Prerequisite: M.R.Phil. 17. Second semester.

For Advanced Undergraduates and Graduates

M.R.Phil. 100. Proseminar (3).

Selected problems in ethics and the philosophy of religion. Individual conferences and seminar discussions of teacher and student reports. The instructor emphasizes current attempts to relate man to the rest of the universe and students are encouraged to make similar syntheses. First semester. Mr. Beardslee

M.R.Phil. 101. Proseminar (3).

Selected problems in ethics and the philosophy of religion. Continuation of M.R.Phil. 100. Second semester. Mr. Beardslee

MUSIC

PROFESSOR SHIELDS

Mus. 3. History and Appreciation of Music (1).

A study of the development of music from early civilization to the end of the formal period. Illustrated. First semester.

Mus. 4. History and Appreciation of Music (1).

A study of the music of the romantic period; nationalism and modern tendencies in music. Illustrated. Second semester.

Mus. 5. Harmony (3).

A study of the selection and the progression of chords. Prerequisite: some knowledge of music. Students should consult the instructor before registering for the course. First semester.

Mus. 6. Harmony (3).

Continuation of Mus. 5 and the study of modulation. Second semester.

Mus. 7. Counterpoint (2).

A study of the art of writing melody against melody in two voices, strict counterpoint in each of the five species. Prerequisite: harmony. First semester.

Mus. 8. Counterpoint (2).

Continuation of Mus. 7 in three and four part counterpoint, strict and free. Study of canon and fugue. Second semester.

THE LEHIGH UNIVERSITY BAND

Band may be elected by suitably qualified freshmen and sophomores in place of military science and tactics. It is an optional subject for suitably qualified juniors and seniors. The band is drilled according to the methods prescribed for regular army bands by one of the sergeants designated for that purpose by the head of the department of military science and tactics.

The band is required to participate in military ceremonies when called upon by the professor of military science and tactics, and to attend all football games played at home and not more than ten other home games, to be specified by the director of athletics. When it appears for military ceremonies the band is to be considered an integral part of the R. O. T. C. regiment.

Coat and cap of uniform, musical instruments, and music are furnished by the University. Members of the band furnish white flannel trousers. A deposit of $25.00 is required from each member of the band for an instrument or uniform.

Seniors and juniors who qualify for membership in the band may substitute band work for the requirement in physical education; sophomores and freshmen may substitute band work for the requirements in physical education and in military science and tactics. Credit is not given during any semester for both band and either of the above-named subjects. Students desiring to play in the band as volunteers may do so, if qualified, and are entitled to the awards named in the following paragraph.

In addition to the above credits, one year of satisfactory service in the band entitles a student to a charm; two years of service, a sweater; three years, $20.00 in cash; and four years, an additional $20.00 in cash.

PHILOSOPHY

ASSOCIATE PROFESSOR F. C. BECKER, Chairman

Phil. 3. Introduction to Philosophy (3).

A systematic approach to the problems which philosophic inquiry brings to the fore. Textbook and collateral readings; discussions. First and second semesters.

Phil. 14. Logic and Scientific Method (3).

An introduction to traditional logic with inquiry into the nature of discovery and proof. Second semester.

For Advanced Undergraduates and Graduates

Phil. 101. Ancient Philosophy (3).

From the beginnings of scientific and philosophical reflection in Ionia to the breakdown of the ancient world. A textbook is employed to systematize and give continuity to the subject matter, but several of the more important dialogues of Plato are studied, together with selections from Aristotle, and other collateral reading. First semester.

Phil. 102. Modern Philosophy (3).

The development of philosophical thought in the seventeenth, eighteenth, and nineteenth centuries with detailed study of some representative works in this period and collateral reading of others. Second semester.

Phil. 107. Proseminar in Contemporary Philosophy (3).

Philosophy since 1900 in the English speaking countries. Related movements in France, Germany, and Italy. Each student prepares during the year a paper on each of three contemporary philosophers representing diverse tendencies. Prerequisite: six hours in philosophy. First semester.
Mr. Becker

Phil. 108. Proseminar in Contemporary Philosophy (3).

Continuation of Phil. 107. Second semester. Mr. Becker

Phil. 109. Esthetics: The Theory of Art and of Beauty (3).

An attempt to reach a consistent, inclusive account of the nature of the esthetic and of its place in the life of man and in social organization. Lectures, reports, and discussions. First semester. Mr. Becker

Phil. 112. Politics: The Theory of Human Relations (3).

Social and political philosophy; a critical examination of the classical theories in this field, and of their assumptions with regard to human nature, justice, and liberty. Historical and constructive. Readings, class discussions, papers. Not given in 1943-44. Mr. Becker

Phil. 115. Ethics: The Theory of Conduct (3).

Ethics as a philosophical science. The origin and development of moral ideas. Analysis of the nature of the good, of duty and right, of moral judgment and moral ends. Second semester. Mr. Becker

Phil. 116. The Theory of Nature (3).

A survey of methods used in the study of nature. Not given in 1943-44.

Phil. 117. Current Philosophical Problems (3).

The philosophical implications of questions that are now to the fore in public debate. Reports, discussions, lectures and a term paper. First semester.

Phil. 171. Readings in Philosophy (2 or 3).

A course of readings in any of the various fields of philosophy, designed for the student who has a special interest in work not covered by the regularly rostered courses. Prerequisite: senior standing and the consent of the instructor. First semester. Mr. Becker

Phil. 172. Readings in Philosophy (2 or 3).

A continuation of Phil. 171. Second semester. Mr. Becker

For Graduates

Prerequisite to major graduate work in philosophy: four undergraduate courses in philosophy or equivalent preparation.

Phil. 201. History of Philosophy, Advanced (2 or 3).

The course centers around the study of Aristotle, his predecessors and successors, to Thomas Aquinas. Alternating with Phil. 205. First semester. Mr. Becker

Phil. 202. History of Philosophy, Advanced (2 or 3).

A study of Kant. The development of Kant's own thought. His dependence upon his precursors and his influence upon those who succeeded him. Alternating with Phil. 206. Second semester.

Phil. 205. Plato (2 or 3).

The fundamental principles of Plato's thought, their development in the Platonic writings, and the change in the emphasis given to them in later times. Alternating with Phil. 201. First semester. Mr. Becker

Phil. 206. Spinoza (2 or 3).

The *Emendation* and the *Ethics*. The growth of modern naturalism, Spinoza's contribution to the movement, and the subsequent history of the doctrine. Alternating with Phil. 202. Second semester. Mr. Becker

Phil. 208. Thesis in Philosophy (2 or 3).

First semester. Mr. Becker

Phil. 209. Thesis in Philosophy (2 or 3).

Second semester. Mr. Becker

Phil. 210. The Theory of Knowledge (3).

The problem is approached in terms of the development of individual experience, taking full account of the biological and psychological facts. The chief steps in the development of knowledge, using that term in the broadest sense. No text is used. Second semester. Not given in 1943-44.

Phil. 211. The Theory of Education (3).

The nature and ends of education. Not given in 1943-44. First semester.

PHYSICAL EDUCATION AND INTRAMURAL SPORTS

ASSISTANT PROFESSOR BARTLETT, Director of Physical Education
MR. HAVACH

The department of physical education and intramural sports has supervision and control of the required recreational physical activities of the student body. The aim of the department is to insure the health and physical development of every student of the University. Facilities for accomplishing this aim are afforded in Taylor Gymnasium, Grace Hall, the field house, the two playing levels of Taylor Field, and Lehigh Field.

Each student is given an annual physical examination by the director of the students' health service, assisted by the department of physical education. He is advised as to postural and physical defects.

All students are required to participate in some form of activity under departmental supervision. This requirement calls for three hours a week in the gymnasium or participation, under the supervision of the department, in an organized sport. In the gymnasium, opportunity is offered in the following activities: mass exercises, mass swimming, beginners' swimming, boxing, fencing, apparatus stunts, hand ball, life saving and golf. All under-

graduate students must swim seventy-five feet before graduation. Students are encouraged to change their activities whenever it is thought best for their all-round development.

A comprehensive program in intramural sports is sponsored for the student body including fraternity, dormitory, interclass and independent groups in touch football, tennis, soccer, badminton, handball, golf, individual athletics, basketball, swimming, wrestling, track, softball, and recreative games. Students are encouraged to participate in these sports and awards are given for excellence in performance.

Members of the R. O. T. C. Unit substitute one hour of military drill for one of the three hours of required physical education.

Individual exercises are prescribed for the correction of physical and functional defects. Students of this group are carefully examined and individually guided.

If a student is injured while engaged in any sport he must report as soon as possible to the director of the students' health service.

The department offers special courses of instruction for teaching physical education.

P.E. 1. Physical Education.
Freshman first semester.

P.E. 2. Physical Education.
Freshman second semester.

P.E. 3. Physical Education.
Sophomore first semester.

P.E. 4. Physical Education.
Sophomore second semester.

P.E. 5. Physical Education.
Junior first semester

P.E. 6. Physical Education.
Junior second semester.

P.E. 7. Physical Education.
Senior first semester.

P.E. 8. Physical Education.

Senior second semester.

P.E. 23. The Organization and Administration of Physical Education (2).

THEORY. The organization and supervision of physical education programs including the history of physical education systems, the administration of intramural activities, the qualifications of physical educators, the methods of teaching, and the planning of programs. First, second, and third semesters.

P.E. 24. The Organization and Administration of Physical Education (1).

PRACTICE. The practice of teaching mass physical activities including athletics, combative events, gymnastic games, apparatus stunts, and efficiency tests. Programs of corrective exercises for postural defects are considered. Three hours practice a week. First, second, and third semesters.

PHYSICS

PROFESSORS BIDWELL, BAYLEY, AND PETERSEN
ASSOCIATE PROFESSORS CARWILE AND CHENEY
ASSISTANT PROFESSOR BERGMANN
MESSRS. BUERSCHAPER AND AGOCS

Phys. 12. Introduction to Physics (3).

A survey course for students in the Colleges of Arts and Science and of Business Administration. A brief introduction to the principal fields of physics. Lecture demonstrations, recitations, and laboratory. Fee, $6.00. First semester.

Phys. 16. General Physics (3).

A continuation of Phys. 12. Lecture demonstrations and recitations. Prerequisite: Phys. 12, Math. 1, 1a, or 1b. Second semester.

Phys. 17. General Physics Laboratory (2).

A laboratory course in general physics to accompany Phys. 16. Prerequisites: Phys. 12, Math. 1, 1a, or 1b. Fee, $10.00. Second semester.

Phys. 22. Mechanics and Properties of Matter (4).

Introduction to mechanics of solids and fluids; dynamics of point masses and rigid bodies; properties of matter. Two recitations, one lecture, and one laboratory period per week. Fee, $6.00. First and second semesters.

Phys. 23. Heat, Sound, and Light (4).

Wave-motion and sound; heat, with emphasis on the mechanical theory; optics with emphasis on those portions of interest to technical students.

Two recitations, one lecture, and one laboratory period per week. (The calculus is employed in this course). Prerequisite: *Math. 13, previously or concurrently.* Fee, $6.00. First and second semester.

Phys. 24. Electricity and Magnetism (4).

Ohm's law, electric and magnetic fields, electromagnetism, induced electromotive forces, etc. Two recitations, one lecture and one laboratory period per week. (The calculus is employed in this course). Prerequisite: *Math. 13, previously or concurrently.* Fee, $6.00. First and second semesters.

Phys. 50. Industrial Employment.

Eight weeks industrial employment during the summer, following the junior year with submission of a written report.

For Advanced Undergraduates and Graduates

Phys. 110. Electrical Laboratory (1).

Precise measurements. Prerequisite: *Phys. 24.* Fee $6.00. First semester. Mr. Bayley

Phys. 111. Electrical Laboratory (1).

Precise measurements. Continuation of Phys. 110. Prerequisites: *Phys. 24;* Phys. 110. Fee, $6.00. Second Semester. Mr. Bayley

Phys. 120. Electric Oscillations and Electric Waves (3).

Electric oscillations and waves and high frequency phenomena. One laboratory and two class periods a week. Prerequisites: *Math. 13, Phys. 23 and 24, or 16;* Phys. 110, 162. Fee, $6.00. Second semester.

Phys. 122. Physical Optics and Spectroscopy (3).

The wave theory of light, interference, diffraction, polarization, etc.; exposition of some phases of spectroscopic phenomena. One laboratory and two class periods a week. Prerequisite: *Math. 13; Phys. 23 and 24, or 16;* Phys. 110, 162. Fee, $6.00. First semester. Mr. Petersen

Phys. 124. Electrical Discharge through Gases (3).

Properties of gaseous ions, the experimental data leading to the electron theory, including a study of vacuum tube phenomena, ionization and resonance potentials, photo-electricity, etc. One laboratory, and two class periods a week. Prerequisite: *Math. 13, Phys. 23 and 24, or 16;* Phys. 110, 162. Fee, $6.00. First semester.

Phys. 126. Pyrometry (3).

High and low temperature measurements. Practical exercises in the use of the thermocouple, the resistance thermometer, the radiation and optical pyrometer, and similar instruments. One laboratory and two class periods a week. Prerequisites: *Math. 13, Phys. 23 and 24, or 16.* Fee, $6.00. Second semester. Mr. Sinkinson

Phys. 140. Teaching of Physics in Secondary Schools (3).

The aims, methods, and content of a secondary school course in physics. Various physics syllabi are used as an outline. Review of a standard text with simple demonstrations. Examination of standard laboratory manuals and performance of selected experiments. Discussion of modern physical theories. Open only to teachers or prospective teachers of high school physics. Four conferences and two laboratory periods per week. Summer session.

Phys. 150. Geophysics (3).

The application of physical measurements to the study of geologic structures. The seismic method. For advanced students in geology, mining, and physics. One laboratory period and two lectures each week. Prerequisites: *Phys. 23 and 24, or 16, Math. 13;* Geol. 10; Geol. 1. Fee, $6.00. First semester.

Phys. 151. Geophysics (3).

Continuation of Phys. 150. Theory and field work in gravitational, magnetic, and electric methods with emphasis on the use of the torsion balance, the dip needle, and the method of equipotentials. Fee, $6.00. Second semester.

Phys. 160. Introduction to Modern Physical Theories (3).

Recent developments, including Maxwell's field equations, photoelectricity, radiation, the quantum theory, X-rays, relativity, and the structure of the atom. Prerequisites: *Math. 13, Phys. 23 and 24, or 16.* First semester.
Mr. Bidwell

Phys. 161. Introduction to Modern Physical Theories (3).

Continuation of Phys. 160. Prerequisites: *Math. 13, Phys. 23 and 24, or 16;* Phys. 160. Second semester. Mr. Bidwell

Phys. 162. Introductory Theory of Electricity and Magnetism (3).

Magnetic fields and potentials; electrostatic fields, potentials and capacities; the Maxwell-Thomson theory of lines of force; electromagnetic fields; variable and alternating current. Prerequisites: *Math. 13, Phys. 24 or 16.* First semester. Mr. Carwile

Phys. 163. Introductory Theory of Electricity and Magnetism (3).

Continuation of Phys. 162. Prerequisites: *Math. 13, Phys. 24 or 16;* Phys. 162. Second semester. Mr. Carwile

Phys. 164. Advanced Laboratory (1 or 2).

Laboratory work of research type. Special problems assigned and the student placed largely on his own initiative. Prerequisite: senior standing in engineering physics. Fee, $6.00. First semester. Mr. Bayley

Phys. 165. Advanced Laboratory (1 or 2).

Continuation of Phys. 164. Prerequisite: senior standing in engineering physics. Fee, $6.00. Second semester. Mr. Bayley

Phys. 170. Spectroscopy (2 or 3).

The interpretation of the findings of modern spectroscopy. A choice will be made from the various divisions of spectrum analysis such as excitation of spectra by impacts, hyper-fine structure, spectra of isotopes, band spectra and molecular constants, Raman spectra, spectrographic means of analysis. The method of obtaining data will be illustrated in laboratory problems. Two class periods per week and one optional laboratory period per week. Students desiring the laboratory work will register for three credits. Second semester. Mr. Petersen

For Graduates

The election of purely graduate courses in physics should ordinarily be preceded by such study of the particular field as that presented in courses in the 100 group. A thorough knowledge of the differential and integral calculus is presupposed and further accompanying study of mathematics is generally advisable.

Math. 219 and 220, Selected Topics in Quantum Mechanics and Relativity, E.E. 209, 210, Radio Communication, and E.E. 215, 216, Vacuum Tubes and Their Application, may be included in a graduate major in physics.

Phys. 201. Kinetic Theory (3).

The classical considerations of the kinetic theory of gases substantially as in Boltzmann with additional applications to electrical phenomena. First semester. Mr. Petersen

Phys. 202. Thermodynamics (3).

A course devoted principally to classical thermodynamics following Planck. Second semester. Mr. Petersen

Phys. 207. Theory of Light (3).

The propagation of light, interference, diffraction; the measurement of wave-length, crystal optics; introduction of quantum theories of the interpretation of spectra. This course follows Shuster and Nicholson's *Theory of Optics*. First semester.

Phys. 208. Theory of Light (3).

Continuation of Phys. 207. Second semester.

Phys. 214. Quantum Mechanics (3).

Brief historical description of present theory. Applications to simple problems. Perturbation methods. Calculation of energy levels and spectral intensities. Quantum theory of collision processes and of radiation. Nuclear quantum mechanics. First or second semester.

Phys. 216. Theory of X-rays (3).

The theory of the production and properties of X-rays; reflection, scattering, and dispersion of X-rays, crystal structure determination; X-ray spectra; ejection of electrons. First or second semester. Mr. Bayley

Phys. 220. Theoretical Physics (3).

The methods of mathematical and theoretical physics. The subject matter covered in this course and in Phys. 221, 222, and 223 is that generally considered necessary for more detailed work in special fields. Required of all candidates for the doctorate. First semester. Mr. Bergmann

Phys. 221. Theoretical Physics (3).

Continuation of Phys. 220. Prerequisite: Phys. 220. Second semester. Mr. Bergmann

Phys. 222. Advanced Theoretical Physics (3).

A continuation of Phys. 220 and 221. Required of all candidates for the doctorate. Prerequisite: Phys. 221 or equivalent. First semester. Mr. Petersen

Phys. 223. Advanced Theoretical Physics (3).

Continuation of Phys. 222. Prerequisite: Phys. 222. Second semester. Mr. Petersen

Phys. 226. Nuclear Physics (3).

Radioactive transformations; properties of alpha, beta, and gamma rays; neutrons, positrons, cosmic rays; nuclear transformations and methods of producing them. First or second semester.

Phys. 228. Physics of the Earth (3).

The figure of the earth; its physical constitution and thermal condition; the causes of mountain building and the nature of isostasy. The course is based on "The Earth" by H. Jeffreys. First semester.

Phys. 260. Seminar in Modern Physics (3).

An extension of Phys. 160 in special fields such as nuclear physics, the metallic state, etc. First semester. Mr. Bidwell

Phys. 261. Seminar in Modern Physics (3).

Continuation of Phys. 260. Second semester. Mr. Bidwell

PORTUGUESE

See Romance Languages

PSYCHOLOGY

ASSOCIATE PROFESSSOR GRAHAM
ASSISTANT PROFESSOR F. C. BECKER
DR. HOFFMAN, M.D.

Psych. 1. Elementary Psychology (3).

The principles of human behavior and the methods of investigation. A foundation course for all students taking further psychology. Each semester.

Psych. 15. Industrial Psychology (3).

The principles of human behavior in the industrial environment. Two lectures and two hours of laboratory each week. Prerequisite: Psych. 1. Second semester.

Psych. 16. Psychology in Business (3).

Psychological problems involved in advertising and selling, sales personnel, and psychology from the standpoint of the consumer. Prerequisite: Psych. 1. Second semester.

Psych. 51. Readings in Psychology (2 or 3).

Readings on organized topics selected after consultation with staff members. Prerequisite: Psych. 1. Each semester.

For Advanced Undergraduates and Graduates

Psych. 101. Psychology of Industrial Personnel (3).

Review of the literature on industrial personnel research. Prerequisites: Psych. 1 and 15, or graduate standing. First semester. Mr. Graham

Psych. 102. Aptitude Testing (3).

The predictive measurements of individual differences, concepts, techniques, and materials necessary to understand the selection and guidance problems. Prerequisite: Psych. 1. Second semester. Mr. Graham

Psych. 104. Social Psychology (3).

A psychological interpretation of social phenomena. Prerequisite: Psych. 1. First semester. Mr. Graham

Psych. 108. Genetic Psychology (3).

The genesis, growth, and development of psychological processes and the bearing of the chief developmental changes upon behavior tendencies. Prerequisite: Psych. 1. Second semester. Mr. Graham

Psych. 109. Abnormal Psychology (3).

Gross maladjustive patterns and deviations in individual and societal behavior. Lectures, discussions, and clinical observations in the psychopathic hospital. Prerequisite: Psych. 1. Second semester. Mr. Graham

Psych. 110. Learning and Motivation (3).

A systematic approach to these basic psychological processes and problems. Prerequisite: Psych. 1. First semester. Mr. Becker

Psych. 111. Minor Research (2 or 3).

Assigned problems for investigation. Prerequisites: Psych. 1 and consent of the head of the department. Each semester. Mr. Graham

Psych. 112. Minor Research (2 or 3).

Either a continuation of Psych. 111 or a different problem for investigation. Prerequisites: Psych. 1 and consent of the head of the department. Each semester. Mr. Graham

Psych. 117. Personality (3).

A psychological interpretation of personality, its development, determinants, analysis, and relationship to successful adjustment. Prerequisites: Psych. 1. First semester. Mr. Graham

Psych. 120. History of Psychology (3).

A historical approach to psychological facts, theories, fields, and methods. First semester. Mr. Becker

Psych. 131. Neurological Aspects of Behavior (1).

Laboratory work and discussions concerning such phases of the structure and function of the nervous system as are of particular interest in the study of psychology. Prerequisite: Psych. 1. Not given in 1943-44. First semester. Mr. Graham

Psych. 132. Sensory Psychology (2).

Laboratory work and discussions covering the various sensory processes from both theoretical and experimental viewpoints. One hour discussion and two hours of laboratory work each week. Prerequisite: Psych. 1. Not given in 1943-44. Second semester. Mr. Graham

Psych. 133. Complex Psychological Processes (3).

Laboratory work involving apparatus techniques for the study of selected phases of attention, perception, learning, and emotion. Six hours of laboratory work per week. Prerequisite: Psych. 1. Second semester. Mr. Graham

For Graduates

During the war emergency, graduate classes will be adjusted to meet student demand and availability of staff.

Psych. 203. Seminar in General Psychology (3).

Some significant aspect in psychological theory or principle, but varied from year to year in accordance with students' needs. Mr. Graham

Psych. 204. Seminar in General Psychology (3).
Either a continuation of Psych. 203 or a new topic. Mr. Graham

Psych. 205. Seminar in Applied Psychology (3).
Some significant applications in psychology, but the topic will vary from year to year in accordance with students' needs. Mr. Graham

Psych. 206. Seminar in Applied Psychology (3).
Either a continuation of Psych. 205 or a new topic. Mr. Graham

Psych. 209. Systematic Psychology (3).
A critical approach to the methods, evidence, and theories of psychology; the building of an organization of basic principles.
Messrs. Graham, Becker

Psych. 210. Systematic Psychology (3).
A continuation of Psych. 209. Prerequisite: Psych. 209.
Messrs. Graham, Becker

Psych. 211. Major Research (3).
Assigned problems for investigation on a graduate level. Mr. Graham

Psych. 212. Major Research (3).
Either a continuation of Psych. 211 or a new problem. Mr. Graham

PUBLIC SPEAKING

See English, Speech

ROMANCE LANGUAGES

PROFESSOR BARTHOLD
ASSOCIATE PROFESSOR SOTO,
ASSISTANT PROFESSOR McNERNEY

FRENCH

Fr. 1. Elementary French (3).
First semester.

Fr. 2. Elementary French (3).
Continuation of Fr. 1. Prerequisite: Fr. 1. Second semester.

Fr. 11. Intermediate French (3).
Reading based on works of 19th and 20th century writers. Formal review of French grammar with prose composition. Outside reading. Prerequisite: *one year of college French or entrance French A.* First semester.

Fr. 12. Intermediate French (3).
Continuation of Fr. 11. Prerequisite: Fr. 11. Second semester.

Fr. 13. Types of French Literature (3).

Training in the ability to read and understand representative works from the seventeenth century to the present day. Accurate translation of texts of graded difficulty. Rapid reading and discussion of other works. Prerequisites: Fr. 11 and 12, or three years of preparatory school French. First semester.

Fr. 14. Types of French Literature (3).

Continuation of Fr. 13. Prerequisite: Fr. 13. Second semester.

Fr. 21. Seventeenth Century French Literature (3).

The age of classicism. Lectures, study of texts, collateral readings, and reports. Prerequisites: Fr. 13 and 14. First semester.

Fr. 22. Eighteenth Century French Literature (3).

Follows Fr. 21. The rise of liberalism as reflected in the writings of Montesquieu, Diderot, Rousseau, and Voltaire. Prerequisites: Fr. 13 and 14. Second semester.

Fr. 31. Nineteenth Century French Literature (3).

Main literary currents of the nineteenth century: romanticism and realism. Lectures, reports, collateral readings. Prerequisites: Fr. 13 and 14. First semester.

Fr. 32. Nineteenth Century French Literature (3).

Continuation of Fr. 31. Prerequisite: Fr. 31.

Fr. 41. French Oral and Written Composition (3).

For students who wish a greater opportunity for practice in the oral and written use of modern French. Prerequisites: Fr. 13 and 14. First semester.

Fr. 42. French Oral and Written Composition (3).

Continuation of Fr. 41. Prerequisite: Fr. 41. Second semester.

For Advanced Undergraduates and Graduates

Fr. 101. French Literature before the Seventeenth Century (3).

A general review of French literature from its beginning through the 16th century. Prerequisites: Fr. 31 and 32, or the equivalent. First semester.

Fr. 102. Contemporary French Literature (3).

Prerequisites: Fr. 31 and 32, or the equivalent. Second semester.

Fr. 103. Proseminar (3).

A study of the works of some author or group of authors or of a period. Prerequisites: Fr. 31 and 32, or the equivalent. First semester.

Fr. 104. Proseminar (3).
Continuation of Fr. 103. Second semester.

For Graduates

Prerequisite: graduate students who major in French must have completed not less than twelve semester hours of French language and literature above the standard intermediate courses. A reading knowledge of Latin and German is desirable; a general knowledge of English literature is required; a thorough acquaintance with Latin grammatical forms is essential for Fr. 201 and 202.

Fr. 201. Old French (3).
First semester.

Fr. 202. Old French (3).
Continuation of Fr. 201. Second semester.

Fr. 203. French Literature of the Renaissance (3).
First semester.

Fr. 204. French Literature of the Renaissance (3).
Continuation of Fr. 203. Second semester.

Fr. 211. The History of the Novel in France (3).
Reading of representative works of different periods and analysis of the growth of the novel as a literary form. First semester.

Fr. 212. The History of the Novel in France (3).
Continuation of Fr. 211. Second semester.

Fr. 213. Modern French Poetry (3).
A history of French poetry from the Parnassian school to the present day. First semester.

Fr. 214. Contemporary French Theater (3).
A history of the contemporary French theater from the *Théâtre libre* to the present day. Second semester.

ITALIAN

Ital. 1. Elementary Italian (3).
Grammar and composition, rapid reading of easy modern prose. First semester.

Ital. 2. Elementary Italian (3).
Continuation of Ital. 1. Prerequisite: Ital. 1. Second semester.

Ital. 11. Intermediate Italian (3).

The age of Dante. Lectures and readings in the *Divina Commedia.* Given in English. Prerequisites: Ital. 1 and 2. First semester.

Ital. 12. Intermediate Italian (3).

Continuation of Ital. 11. Second semester.

PORTUGUESE

Port. 1. Elementary Portuguese (3).

A study of Portuguese grammar and forms. Practice in writing and speaking Portuguese. Prerequisite: consent of the instructor. First semester.

Port. 2. Elementary Portuguese (3).

Continuation of Portuguese 1. Second semester.

SPANISH

Span. 1. Elementary Spanish (3).

First and second semesters.

Span. 2. Elementary Spanish (3).

Continuation of Span. 1. Prerequisite: Span. 1. First and second semesters.

Span. 11. Intermediate Spanish (3).

Reading of modern Spanish prose, with a view of acquiring exactness and speed in reading. Rapid review of grammer with prose composition. Prerequisite: *one year of college Spanish or entrance Spanish A.* First semester.

Span. 12. Intermediate Spanish (3).

Continuation of Span. 11. Prerequisite: Span. 11. Second semester.

Span. 21. Spanish Novels and Plays (3).

Reading and discussion of selected texts. Outside reading and reports. Prerequisites: Span. 11 and 12. First semester.

Span. 22. Spanish Novels and Plays (3).

Continuation of Span. 21. Prerequisite: Span. 21. Second semester.

Span. 31. Spanish Oral and Written Composition (3).

For students who wish a greater opportunity for practice in the oral and written use of modern Spanish. Prerequisite: *consent of the head of the department.* First semester.

Span. 32. Spanish Oral and Written Composition (3).

Continuation of Span. 31. Second semester.

For Advanced Undergraduates and Graduates

Span. 101. Spanish Fiction of the Sixteenth and Seventeenth Centuries (3).

The novel of the Golden Age with special attention to Cervantes' *Don Quixote*. Collateral reading and reports. Prerequisites: Span. 21 and 22. First semester.

Span. 102. Spanish Drama of the Sixteenth and Seventeenth Centuries (3).

Selected plays by Lope de Vega, Tirso de Molina, and Calderón. Collateral reading and reports. Prerequisites: Span. 21 and 22. Second semester.

Span. 103. Proseminar (3).

A study of the works of some author or group of authors or of a period. Prerequisites: Span. 21 and 22. First semester.

Span. 104. Proseminar (3).

Continuation of Span. 103. Second semester.

Span. 111. Spanish-American Literature (3).

Brief survey of the whole field of Spanish-American literature, with emphasis on works of modern writers. Prerequisites: Span. 21 and 22. First semester.

Span. 112. Spanish-American Literature (3).

Continuation of Span. 111. Second semester.

For Graduates

Prerequisite: Graduate students who major in Spanish must have completed not less than twelve semester hours of Spanish language and literature above the standard intermediate courses. A reading knowledge of Latin and French is desirable.

Span. 201. Old Spanish (3).

First semester.

Span. 202. Old Spanish (3).

Continuation of Span. 201. Second semester.

Span. 211. The Modern Spanish Novel (3).

Reading, reports, and lectures. First semester.

Span. 212. The Modern Spanish Novel (3).

Continuation of Span. 211. Second semester.

SOCIOLOGY

See Economics and Sociology

SPANISH

See Romance Languages

SPEECH

See English

STATISTICS

See Accounting

DIVISION OF INTERCOLLEGIATE ATHLETICS

ACTING DIRECTOR CARAWAY
MESSRS. SHERIDAN, MERCUR, PRENDERGAST, AND BROWN

The division of intercollegiate athletics offers opportunity to the undergraduate student body to participate in intercollegiate competition both at home and abroad with institutions which are Lehigh's natural rivals and also other institutions which are at some distance.

The intercollegiate program consists of varsity teams in football, soccer, wrestling, basketball, swimming, tennis, track, and baseball, as well as junior varsity teams in football, wrestling, basketball, swimming, and baseball.

Army Specialized Training Program

ARMY SPECIALIZED TRAINING PROGRAM

Staff members, in addition to regular members of the Faculty, appointed for varying periods of service, who participated in the work of the Army Specialized Training Program.

Staff

Laura M. Ashbaugh, M.A.,.....*Mathematics*
Marcel Cabijos.....*French*
Anthony S. Corbiere, Ph.D.,.....*French*
Andrew S. Coxe, 2nd.Lt., A.U.S.,.....*Military Training*
John E. Dougherty, 1st.Lt., A.U.S.,.....*Military Training*
John William Frey, Ph.D.,.....*German*
Eugene E. Froemel, 1st.Lt., A.U.S.,.....*Military Training*
James A. Gersoni, Capt., U.S.A., Res.,.....*Military Training*
John S. Grasty, 1st.Lt., U.S.A., Res.,.....*Military Training*
Elmer A. Grimm, 2nd.Lt., A.U.S.,.....*Military Training*
Harry R. Hendrickson, 1st.Lt., U.S.A., Res.,.....*Military Training*
Rudolph P. Hommel .....*German*
Clarence A. Homan, Major, U.S.A., Res.,.....*Military Training*
Julien B. Johnson, Capt., U.S.A., Res.,.....*Military Training*
Olof Johnson, 2nd.Lt., A.U.S.,.....*Military Training*
Robert Charles King, M.A.,.....*Mathematics*
William N. Koppel, 2nd.Lt., A.U.S.,.....*Military Training*
Nicholas A. Lepore, 2nd.Lt., A.U.S.,.....*Military Training*
Ward N. Madison, Capt., A.U.S.,.....*Military Training*
George F. McGinn, Major, U.S.A., Res.,.....*Military Training*
John B. Noggle, 2nd.Lt., A.U.S.....*Military Training*
Anne-Marie Palmer.....*German*
Marlin Asher Rader, M.A.,.....*Mathematics*
Theodore O. Reyhner, M.A.,.....*Civil Engineering*
Robert Erwin Scheetz, M.Ed.,.....*Mathematics*
Joseph McDonough Shumaker, Ed.D.,.....*History*
Henry G. Shires, Capt., U.S.A., Res.....*Military Training*
Switzer W. Smith, M.S.....*Mathematics*
Richey B. Sumner, Capt., U.S.A., Res.,.....*Military Training*
Marcelle Henry Walker, M.A.,.....*French*
Edward R. Ward, C.E.,.....*Civil Engineering*
Richard O. Weber, 1st.Lt., U.S.A., Res.,.....*Military Training*
Harvey J. Williams, 1st.Lt., U.S.A., Res.,.....*Military Training*
Ralph Charles Wood, Ph.D.,.....*German*

ARMY SPECIALIZED TRAINING PROGRAM

The 3309th Service Unit of the Army Specialized Training Division of the Army Service Forces, War Department, was established at Lehigh University in June 1943, and instruction began on July 12, 1943. Instruction included Basic Engineering curricula, Advanced Engineering curricula, and Foreign Area and Language curricula.

The regular unit of the Reserve Officers Training Corps, consisting of regular civilian students and students enlisted in the Enlisted Reserve Corps (ERC), became known as the 3351st Service Unit of the ASTP, but continued to function fundamentally as it had previously functioned.

The curricula and courses offered under the 3309th Service Unit organization are set forth below. Full information is given both to provide a record of the University's participation in the war effort and to provide adequate information for the evaluation of academic credit for work completed by trainees. Instruction was provided for the most part by the regular members of the University faculty, with some crossing of departmental lines, but was supplemented by additional staff appointments as set forth above.

Basic Engineering Curricula

BE. 1. Term 1.

Taught July 12, 1943 to October 2, 1943.
October 11, 1943 to January 1, 1944.
January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 205.	Fundamental Concepts and Principles	3	–
AST. 111a.	English	3	–
AST. 163a.	Geography	2	–
AST. 133a.	History	3	–
AST. 406.	Algebra and Trigonometry	6	–
AST. 304.	Mechanics	4	3
First Term Basic Military Course		2	2
Physical Training		–	6

BE. 1R. Term 1. (Refresher).

Taught August 23, to October 2, 1943.

(This program of subjects was instituted for trainees found deficient in mathematics and English; trainees continued in the other subjects of BE. 1, Term 1, in the regular manner.)

		Class Hours	Laboratory Hours
AST.	English (Refresher)	3	—
AST. 133a.	History	3	1
AST.	High School Algebra (Refresher)	6	—
AST.	Plane Geometry (Refresher)	5	—
AST. 304.	Mechanics	4	3
First Term Basic Military Course		2	2
Physical Training		—	6

BE. 1. Term 2.

A. (This program of subjects conforms to that of the War Department for B.E. 1, Term 2.)

Taught October 11, 1943 to January 1, 1944.
January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 206.	Chemical Principles and Important Elements	2	4
AST. 111b.	English	2	—
AST. 163b.	Geography	2	—
AST. 133b.	History	2	—
AST. 407.	Analytic Geometry	5	—
AST. 305.	Heat, Sound, and Light	4	3
Second Term Basic Military Course		2	2
Physical Training		—	6

B. (Engineering Drawing was substituted for Chemistry in order to balance the teaching load.)

Taught October 11, 1943 to January 1, 1944.
January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 001.	Engineering Drawing	—	6
AST. 111b.	English	2	—
AST. 163b.	Geography	2	—
AST. 133b.	History	2	—
AST. 407.	Analytic Geometry	5	—
AST. 305.	Heat, Sound, and Light	4	3
Second Term Basic Military Course		2	2
Physical Training		—	6

BE. 1. Term 3.

A. (This program of subjects conforms to that of the War Department for BE. 1, Term 3.)

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 001.	Engineering Drawing	—	6
AST. 111c.	English	2	—
AST. 163c.	Geography	2	—
AST. 133c.	American Government (National)	2	—
AST. 408.	Differential Calculus	5	—
AST. 306.	Electricity and Magnetism	4	3
Third Term Basic Military Course		2	2
Physical Training		—	6

B. (Chemistry was substituted for Engineering Drawing in the foregoing program of subjects in order to balance the teaching load. Trainees

completing Term 2B and Term 3B completed the same work as those completing Term 2A and Term 3A. In each case a trainee in Term 2A followed with Term 3A and a trainee in Term 2B followed with Term 3B.)

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 206.	Chemical Principles and Important Elements	2	4
AST. 111c.	English	2	–
AST. 163c.	Geography	2	–
AST. 133c.	American Government (National)	2	–
AST. 408.	Differential Calculus	5	–
AST. 306.	Electricity and Magnetism	4	3
Third Term Basic Military Course		2	2
Physical Training		–	6

BE. 2. Term 1.

Taught October 11, 1943 to January 1, 1944.

		Class Hours	Laboratory Hours
AST. 078.	Plane Surveying	2	3
AST. 111a.	English	3	–
AST. 163a.	Geography	2	–
AST. 133a.	History	3	–
AST. 406.	Algebra and Trigonometry	6	–
AST. 304.	Mechanics	4	3
First Term Basic Military Course		2	2
Physical Training		–	6

BE. 2. Term 2.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 008.	Topographical Surveying	–	8
AST. 111b.	English	2	–
AST. 163b.	Geography	2	–
AST. 133b.	History	2	–
AST. 407.	Analytic Geometry	5	–
AST. 305.	Heat, Sound, and Light	4	3
Second Term Basic Military Course		2	2
Physical Training		–	6

BE. 4A1. Term 4A.

Taught July 12, 1943 to October 2, 1943.
October 11, 1943 to January 1, 1944.

(A refresher curriculum to prepare trainees to enter upon the work of the Advanced Engineering curricula.)

		Class Hours	Laboratory Hours
AST. 001.	Engineering Drawing (Refresher)	–	3
AST. 406-407-408.	Algebra, Trigonometry, Analytic Geometry, Differential Calculus	10	–
AST. 304.-305-306.	Physics (Refresher)	8	3
First Term Advanced Military Course		2	2
Physical Training		–	6

BE. 5E. Term 1.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 078.	Plane Surveying	2	3
AST. 406-407-408.	Algebra, Trigonometry, Analytic Geometry, Differential Calculus	9	–
AST. 305-306.	Physics (Refresher)	8	3
Third Term Advanced Military Course		2	2
Physical Training		–	6

Advanced Engineering Curricula

Ch.E. 1. Chemical Engineering. Term 4.

Taught July 12, 1943 to October 2, 1943.

		Class Hours	Laboratory Hours
AST. 401.	Qualitative Analysis	2	4
AST. 402.	Quantitative Analysis	2	6
AST. 403.	Industrial Chemical Calculations	3	–
AST. 403.	Physical Chemistry	3	2
AST. 401.	Integral Calculus	5	–
First Term Advanced Military Course		2	2
Physical Training		–	6

Ch.E. 1. Chemical Engineering. Term 5.

Taught October 11, 1943 to January 1, 1944.

		Class Hours	Laboratory Hours
AST. 404.	Physical Chemistry	3	3
AST. 405.	Organic Chemistry	4	6
AST. 415.	Unit Operations I	4	2
AST. 401.	Mechanics	6	–
Second Term Advanced Military Course		2	2
Physical Training		–	6

Ch.E. 1. Chemical Engineering. Term 6.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 335.	Thermodynamics	5	–
AST. 416.	Unit Operations II	3	–
AST. 417.	Unit Operations Lab. I	–	7
AST. 401.	Strength of Materials	4	–
AST. 401.	Elements of Electrical Engineering	4	4
Third Term Advanced Military Course		2	2
Physical Training		–	6

C.E. 1. Civil Engineering. Term 4.

Taught October 11, 1943 to January 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Mechanics	6	–
AST. 407.	Elementary Surveying	–	6
AST. 408.	Engineering Drawing — Structural Drafting	–	3
AST. 401.	Elements of Electrical Engineering	4	4
AST. 401.	Integral Calculus	5	–
First Term Advanced Military Course		2	2
Physical Training		–	6

C.E. 1. Civil Engineering. Term 5.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Strength of Materials	4	–
AST. 401.	Materials Testing Laboratory	–	3
AST. 401.	Fluid Mechanics	4	–
AST. 408.	Advanced Surveying	2	3
AST. 413.	Stress Analysis	2	3
AST. 405.	Internal Combustion Engines	3	3
Second Term Advanced Military Course		2	2
Physical Training		–	6

E.E. 1. Electrical Engineering. Term 4.

Taught October 11, 1943 to January 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Mechanics	6	–
AST. 403.	Electrical Measurements	–	6
AST. 405.	Electric and Magnetic Phenomena	5	3
AST. 401.	Integral Calculus	5	–
AST. 406A.	Shop Practice	–	3
First Term Advanced Military Course		2	2
Physical Training		–	6

E.E. 1. Electrical Engineering. Term 5.

Taught October 11, 1943 to January 1, 1944.
January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Strength of Materials	4	–
AST. 401.	Materials Testing Laboratory	–	3
AST. 409.	Direct Current Machinery	3	3
AST. 414.	Electric Circuits	5	6
AST. 403.	Engineering Mathematics	3	–
Second Term Advanced Military Course		2	2
Physical Training		–	6

E.E. 1. Electrical Engineering. Term 6.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 410.	Alternating Current Machinery	5	3
AST. 415.	Electronics and Associated Circuits	5	6
AST. 416.	Transients	2	3
AST. 417.	Distributed Constants	3	–
Third Term Advanced Military Course		2	2
Physical Training		–	6

M.E. 1. Mechanical Engineering. Term 4.

Taught July 12, 1943 to October 2, 1943.
October 11, 1943 to January 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Mechanics	6	–
AST. 401.	Integral Calculus	5	–
AST. 401.	Thermodynamics	5	–
AST. 406.	Engineering Drawing	–	4
AST. 406.	Shop Practice	–	6
First Term Advanced Military Course		2	2
Physical Training		–	6

M.E. 1. Mechanical Engineering. Term 5.

Taught October 11, 1943 to January 1, 1944.
January 10, 1943 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Strength of Materials	4	–
AST. 401.	Materials Testing Laboratory	–	3
AST. 402.	Kinematics	3	3
AST. 410.	Internal Combustion Engines	6	–
AST. 420.	Mechanical Engineering Laboratory	–	3
AST. 430.	Metallography and Heat Treatment	4	–
Second Term Advanced Military Course		2	2
Physical Training		–	6

M.E. 1. Mechanical Engineering. Term 6.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Fluid Mechanics	4	–
AST. 401.	Elements of Electrical Engineering	4	4
AST. 408.	Machine Design	3	6
AST. 410.	Mechanical Vibrations	3	–
AST. 411.	Internal Combustion Engines Lab.	–	4
Third Term Advanced Military Course		2	2
Physical Training		–	6

AE. S1. Term 5.

Taught October 13, 1943 to January 1, 1944.

		Class Hours	Laboratory Hours
AST. 001.	Engineering Drawing	–	6
AST. 401.	Mechanics	6	–
AST. 401.	Thermodynamics	5	–
AST. 406.	Shop Practice	–	6
AST. 430.	Metallography and Heat Treatment	4	–
Second Term Advanced Military Course		2	2
Physical Training		–	6

AE. S1. Term 6.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 401.	Strength of Materials	4	–
AST. 401.	Materials Testing Laboratory	–	3
AST. 401.	Elements of Electrical Engineering	4	4
AST. 410.	Internal Combustion Engines	6	–
AST. 411.	Internal Combustion Engines Lab.	–	4
Third Term Advanced Military Course		2	2
Physical Training		–	6

AE. S3. Term 4.

Taught January 10, 1944 to April 1, 1944.

		Class Hours	Laboratory Hours
AST. 326.	Mechanisms and Power Transmission	3	4
AST. 336.	Internal Combustion Engines	3	4
AST. 406.	Engineering Drawing	–	4
AST. 406.	Shop Practice	–	6
First Term Advanced Military Course		2	2
Physical Training		–	6

Note: A large proportion of the trainees in the foregoing curricula for the term from January 10, 1944 to April 1, 1944 were transferred to other assignments on March 25, 1944, as shown for the individuals concerned on the list of trainees given subsequently.

Foreign Area and Language Curricula

Contingents for the study of French and German began on July 12, 1943 and continued until March 25, 1944. The curricula for French and German were identical except for the particular language studied.

FAL. 704. Term 4.

	Class Hours	Laboratory Hours
Language Study (French 756 or German 756)...	7	10
Area Study		
AST. 710. Economics and Sociology.....	3	–
AST. 710. Geography	3	–
AST. 710. Government	3	–
AST. 134. World Affairs	4	–
First Term Advanced Military Course.....	2	2
Physical Training	–	6

FAL. 71. Term 5.

	Class Hours	Laboratory Hours
Language Study (French 216 or German 216)...	5	10
Area Study		
AST. 266. Economics and Sociology	2	–
AST. 266. Geography — Maps	1	–
AST. 266. Geography — Place	2	–
AST. 266. Government	3	–
AST. 202. Contemporary History 1914 to the Present (World Affairs)	2	–
Second Term Advanced Military Course.....	2	2
Physical Training	–	6

FAL. 71. Term 6.

	Class Hours	Laboratory Hours
Language Study (French 217 or German 217)...	5	10
Area Study		
AST. 267. Economics and Sociology	2	–
AST. 267. Geography — Maps	1	–
AST. 267. Geography — Place	2	–
AST. 267. Government	3	–
AST. 203. Contemporary History 1914 to the Present (World Affairs).....	2	–
Third Term Advanced Military Course.....	2	2
Physical Training	–	6

TRANSCRIPTS AND RECORDS

Grades were recorded for each course in the Foreign Area and Language Curricula as named above.

For the official War Department, Army Service Forces, transcript, grades in individual courses were combined according to a prescribed weighting, as given below.

First term. Area Study—Geographical Aspects, final grades obtained by weighting Economics and Sociology 1, Geography 3, Government 3, and World Affairs 3.

Second term. Area Study final grades obtained by weighting Economics and Sociology 2, Geography—Maps 1, Geography—Place 2, and Government 3. Contemporary History 1914 to the present (World Affairs) was given a separate grade.

Third term. Same as for second term.

DESCRIPTION OF COURSES

Following is a description of the courses taught at Lehigh University under the Army Specialized Training Program. Course numbers are those supplied by the Army Specialized Training Division of the Army Service Forces, with certain local modifications. In the case of courses bearing the same Army number for each of two or more terms, the letters "a", "b", and "c" have been added for clarity in designating the respective terms of work. Contact hours are recorded without implication as to term hours or semester hours of credit.

Basic and Advanced Engineering

CHEMICAL ENGINEERING AND CHEMISTRY

AST. 205. Fundamental Concepts and Principles.

Atomic theory, atomic structure; periodic classification of the elements. Kinetic theory, states of matter, solutions. The laws of chemical change; quantitative relationships; types of chemical reactions. Detailed study of oxygen, hydrogen, the halogens, sulfur and the important compounds of these elements. Holmes, "General Chemistry". (3 class hours.)

AST. 206. Chemical Principles and Important Elements.

Ionic reactions and chemical equilibrium. Nitrogen and its compounds. Carbon and silicon; types and applications of organic compounds. Metals and alloys; metallurgical processes; the alkali and alkaline earth metals and their compounds; the copper group of metals. Holmes, "General Chemistry". Billinger and Smith, "General Chemistry Experiments". (2 class hours, 4 laboratory hours.)

AST. 335. Thermodynamics.

The fundamental concepts of thermodynamics; the first law, equilibrium and phase rule. Phase relations, heat capacity and heat of reaction; properties of materials, perfect gases, generalized pressure, volume, temperature relations; the second law, interpretation of second law principles. Fluid flow, power cycles, steam engines and turbines, refrigeration, fugacity and activity. Equilibrium constants, partial molal quantities, electrochemical effects; the third law of thermodynamics. Weber, "Thermodynamics for Chemical Engineers". (5 class hours.)

AST. 401. Qualitative Analysis.

Study of the reactions and systematic procedures for the separation and identification of the common metal ions and the anions. The principles of precipitation. Laboratory practice of analysis by the semi-micro method. Hazlehurst and Anderson, "Qualitative Analysis". (2 class hours, 4 laboratory hours.)

AST. 402. Quantitative Analysis.

The principles of accurate chemical analysis by gravimetric and volumetric methods. Acidimetry, alkalimetry, indicators; oxidimetry. Laboratory practice in the analysis of typical materials. Willard and Furman, "Elementary Quantitative Analysis". (2 class hours, 6 laboratory hours.)

AST. 403. Physical Chemistry.

The properties of matter in the gaseous, liquid and solid states; kinetic theory; crystal structure. Solutions, Raoult's Law; colloids. The periodic law and atomic structure. Millard, "Physical Chemistry for Colleges". (3 class hours, 2 laboratory hours.)

AST. 403. Industrial Chemical Calculations.

Problems relating to stoichiometric principles, behavior of gases, vapor pressure, humidity and saturation, solubility and sorption, material balance, thermophysics, thermochemistry, fuels and combustion; chemical, metallurgical, and petroleum processes. Long and Anderson, "Chemical Calculations" and Hongen and Watson, "Chemical Process Principles". (3 class hours.)

AST. 404. Physical Chemistry.

Thermochemistry, radiation and chemical change; radioactive changes; free energy of chemical change. Equilibrium in homogeneous and heterogeneous systems; reaction kinetics. Electrochemistry; electromotive and electrogenetic cells. Millard, "Physical Chemistry for Colleges". (3 class hours, 3 laboratory hours.)

AST. 405. Organic Chemistry.

Systematic survey of the important types of carbon compounds. Occurrence, preparation, general reactions and uses of hydrocarbons, alcohols, acids, esters, etc. Introduction to the chemistry of natural products—carbohydrates, fats, proteins—and their derivatives; synthetic resins and rubbers. Colbert, "A Shorter Course in Organic Chemistry". (4 class hours, 6 laboratory hours.)

AST. 415. Unit Operations I.

Principles of chemical engineering related to material and energy balances; fluid flow, materials handling, filtration, mixing, grinding, size separation and classification. Badger and McCabe, "Elements of Chemical Engineering". (4 class hours, 2 computation hours.)

AST. 416. Unit Operations II.

Heat generation and exchange; evaporation, humidity and air conditioning, drying, distillation, absorption, extraction, and crystallization. Badger and McCabe, "Elements of Chemical Engineering". (3 class hours.)

AST. 417. Unit Operations Lab. I.

Laboratory experiments and report writing on fluid flow, heat transfer, refrigeration, filtration, classification, evaporation, distillation, absorption and drying. Various reference books, notes. (7 laboratory hours.)

CIVIL ENGINEERING

AST. 001 (Refresher). Engineering Drawing.

A review of the fundamentals of Engineering Drawing. The common geometrical constructions encountered in engineering drawing; the theory and application of orthographic projections as principal views, sectional views; dimensioning for working drawings; two or more complete working drawings; auxiliary views; development and intersections of prisms, cylinders, cones, etc., which form the basis for the more complicated structures. As engineering structures are held together by devices called fasteners, one plate was devoted to bolts and types of screw threads; finally a detailed assembly drawing was included. Grades were based on plates and quizzes. Carter-Thompson, "Engineering Drawing". (3 laboratory hours.)

AST. 001. Engineering Drawing.

The fundamental requirements of different phases of Engineering Drawing, such as machine and structural drafting, as accepted in practice, with emphasis on fundamental principles, accuracy, speed, lettering, and neatness. Two plates on geometrical constructions were followed by several plates on the theory and application of orthographic projections, as principal views. There followed instruction on sectional and auxiliary views, and methods of dimensioning in preparation for working drawings. A detailed assembly drawing of a machine part was completed. Two plates were devoted to bolts and types of bolt and screw threads. Development and intersections of prisms, cylinders, cones, etc., which form the basis for the more complicated structures. During the course the requirement of neat engineering lettering was emphasized. Grades were based on plates and quizzes. Carter-Thompson, "Engineering Drawing". (6 laboratory hours.)

AST. 078. Plane Surveying.

The principles and methods of surveying and the use of the fundamental surveying instruments. Fundamental concepts: definitions, kinds and operation of surveying, uses of surveys, units of measurements, precision and accuracy, general computations, errors, notes. Measurement of distance: general methods, choice of methods, pacing, steel tapes, horizontal and slope measurements, errors and corrections, mistakes, tape surveys. Measurement of difference in elevation: indirect and direct leveling, instruments, (hand level, Dumpy and Wye level, rods), differential and profile leveling, instrument adjustments, leveling for earthwork (cross sections, grades). Measurement of angles and direction: location of points, reference meridians, compass, horizontal and vertical angles, transit, description and use, prolonging lines, measuring angles, field practice, methods and difficulties, adjustments. Transit surveys: equipment, transit stations and lines, traverse, locating details, stadia surveying, property surveys, construction surveys for buildings, drainage, gun emplacements, etc., traverse computations. Topographic surveying: general representation of relief, contours, scale and intervals used, control, plane table equipment, location of details. Breed, "Surveying"; War Dept. TM 5-235, "Surveying". (2 class hours, 3 laboratory hours.)

AST. 008. Topographic Surveying and Mapping.

The principles of map interpretation, compilation, and construction. (Instruction confined to those essentials in surveying and drafting work necessary for the rapid making of accurate and legible maps.)

Drafting technique: instruments and equipment, lettering, conventional signs, military symbols, drafting exercises; fundamentals of map construction: maps, scales, control, projection, grid systems, relief, distances and directions, location of features; topographic mapping: field work in transit stadia method, plane table surveys, minor control, an angle corrections, bearing calculations, latitude and departure calculations, orientation, location of details, interpolation and sketching, area calculations, cut and fill problems; preparation of maps: data obtained in field was worked up into finished maps suitable for Military purposes. Breed, "Surveying", Art: 76-83; 109-117; 218-231; 255-289; Carter-Thompson, "Engineering Drawing"; War Dept. TM 5-230, "Topographic Drafting".

AST. 401. Mechanics.

Statics: Coplanar and non-coplanar force systems, conditions for equilibrium, resolution and composition of force systems, applications to plane and simple three-dimensional trusses. Suspended cables, sliding and rolling friction center of gravity. Dynamics: rectilinear and curvilinear motion, kinetics of a particle and of a body, translation and rotation, moments of inertia, relative motion. Concepts of work, power, energy, of linear and angular impulse and momentum with typical applications. Frank L. Brown, "Engineering Mechanics". (6 class hours.)

AST. 401. Strength of Materials.

The physical properties of the usual structural materials and their action as members of machines and structures: stresses and strains in tension, compression, and shear; riveted and welded joints; shear and moment in beams; design of simple, cantilever, and continuous beams for strength and stiffness; beams of two or more materials; resilience of beams; combined flexural, tensile, compressive, and shearing stresses. Design of columns. Seely, "Resistance of Materials". (4 class hours.)

AST. 401. Materials Testing Laboratory.

A series of experiments constituting a study of the standard methods of testing the physical properties of engineering materials, including the use and calibration of testing machines and strain gages, performed in groups of three or four men. Experiments included: study and calibration of lever type testing machine; study and calibration of strain gauges; modulus of elasticity of steel in tension and other properties; torsion test of steel; shear, compression, and flexure tests of wood; flexure tests of steel; tests of wood column; hardness, and impact tests on metals. American Society for Testing Materials, "Selected Standards for Students in Engineering"; Laboratory Manual, Special Instruction Sheets for Each Experiment. (3 laboratory hours.)

AST. 401. Fluid Mechanics.

Properties of fluids such as density, viscosity, compressibility, fluid statics, pressure forces on submerged bodies, pressure gauges, floatation, elementary kinematics and dynamics of fluid flow, various types of meters, such as Pitot tube, Venturi meter, orifices, weirs, rotameters, anemometers. Friction-flow in pipes for incompressible and compressible fluids, flow in open channels, steady and unsteady, laminar and turbulent types of motion. Form-resistance of immersed bodies, skin-friction and boundary-layer theory, dynamic lift and propulsion. Various types of pumps, turbines, fluid couplings, torque converters, operating and performance characteristics. Binder, "Fluid Mechanics". (4 class hours.)

AST. 406. Engineering Drawing.

For description see under Mechanical Engineering.

AST. 407. Elementary Surveying.

The elementary principles and methods of surveying and the use of the fundamental surveying instruments. Fundamental concepts: definitions, kinds and operation of surveying, uses of surveys, units of measurements, precision and accuracy, general computations, errors, notes. Measurement of distance: general methods, choice of methods, pacing, steel tapes, horizontal and slope measurements, errors and corrections, mistakes, tape surveys. Measurement of different in elevation: indirect and direct leveling, instruments (hand level, Dumpy and Wye level, rods), differential and profile leveling, instrument adjustments, leveling for earthwork (cross section, grades). Measurement of angles and direction: location of points, reference meridians, compass, horizontal and vertical angles, transit, description and use, prolonging lines, measuring angles, field practica, methods and difficulties, adjustments. Transit surveys: equipment, transit stations and lines, traverse, locating details, stadia surveying, property surveys, construction surveys for buildings, drainage, gun emplacements, etc., traverse computations. Topographic surveying: general representation of relief, contours, scale and intervals used, control, location of details. Breed, "Surveying"; War Dept. TM 5-235, "Surveying". (6 laboratory hours.)

AST. 408. Engineering Drawing—Structural Drafting.

Training in reading and understanding structural drawings such as erection drawings, conventional marking systems, shop drawings, and plate girder details. Execution of pencil drawings of simple details of timber and steel construction, including details of a small timber bridge, steel roof truss, and typical beam and column connections. (Only a few individuals were qualified to take this course, consequently the work was at a very elementary level.) Carter-Thompson, "Engineering Drawing", Chapter 22; American Institute of Steel Construction, "Manual"; Eney and Savastio, "Problems in Structural Drafting". (3 laboratory hours.)

AST. 408. Advanced Surveying.

Reconnaissance surveys, preliminary and location surveys; horizontal and vertical curves, lines, and grades; cross sections; computation of

earthwork; astronomy; triangulation; base line; latitude and longitude; adjustments; field work illustrative of classroom topics. Breed, "Surveying". (2 class hours, 3 laboratory hours.)

AST. 413. Stress Analysis.

Theory of simple structures. Reactions for fixed loads; algebraic and graphic determination. Stresses in simple trusses; fixed loads; algebraic resolution of forces, graphic diagram—Bow's method, algebraic method by sections—shears and moments. Determination of loads; dead load, live load, impact, wind loads, etc. Parallel chord bridge trusses; method of coefficients for dead and moving uniform live loads, influence diagrams, impact stresses and maximum combinations. Bridge trusses with inclined chords; method of sections by moments. Wind stresses; lateral systems, simple portals, approximate methods, stresses in a mill building frame. Beams and girders; shears and bending moments, shear and moment diagrams. Sutherland and Bowman, "Structural Theory". (2 class hours, 3 laboratory hours.)

ELECTRICAL ENGINEERING

AST. 401. Elements of Electrical Engineering.

Topics covered: Conductor materials and resistance; allowable current capacity; use of ammeters, voltmeters, and wattmeters to measure current voltage and power in D.C. and A.C. circuits; series and parallel circuits; circuit connections and operating characteristics of D.C. and A.C. generators and motors; delta and wye connections; transformers their circuits and characteristics; conversion equipment and theory; transmission and distribution of power; elementary theory of electronics and tube applications. Recitations, problem work, and written tests. Laboratory experiments covering the important theory with complete report; results were checked against theory of the class room. Gray and Wallace, "Principles and Practice of Electrical Engineering", Chapters 1 to 37. (4 class hours, 4 laboratory hours.)

AST. 403. Electrical Measurements.

The use of current and ballistic galvanometers; conditions of precision in bridge measurements, measurement of high and low resistances; the potentiometer, calibration of D.C. meters; magnetization of iron and hysteresis loop; several alternating current bridges; the static characteristics of diodes, triodes, and thyratron tube; and the dynamic characteristics of triodes. Law, "Electrical Measurements", with mimeographed material. (6 laboratory hours.)

AST. 405. Electric and Magnetic Phenomena.

Kirchhoff's Laws, loop currents, Wheatstone bridge, resist, power and energy, networks and their amplification, super-position, resistances in series and in parallel, delta and wye networks. The magnetic circuit, series and parallel, hysteresis and eddy current, Lenz's Law, L. and M. coefficient of coupling, growing and dyeing transients in D.C., time con-

stant, ΦZ =E=B1V, F=B1I, av., max., instantaneous values, ammeter shunts, volt meter multipliers, batteries, electroplating. A D. C. course, Laboratory data checked against results calculated from theory. Timbie and Bush, "Principles of Electrical Engineering". (5 class hours, 3 laboratory hours.)

AST. 409. Direct Current Machinery.

The dielectric field and condensers; the magentic field (review); magnetic properties of iron and steel; dynamo construction, armatures reaction; characteristics of shunt, series, and compound generators; generator regulation, etc.; characteristics of shunt, series, compound, and differential motors; commutation; efficiency and rating of machines; batteries. Problems and written tests; laboratory experiments, with complete reports, illustrating the major principles. Magmusson, "Direct Currents", Chapters IX-XIX. (3 class hours, 3 laboratory hours.)

AST. 410. Alternating Current Machinery.

Transformers, construction, impedance, regulation, single phase and polyphase connections; a-c generators, construction, pitch distribution and pole factors, direct and quadrature synchronous reactance, vector diagrams, synchronous motors, parallel operation of a-c. generators; induction motors and generators, etc. Laboratory experiments on transformer regulation, three-phase connections, alternating current generators, synchronous motors, and induction motors. Punchstein and Lloyd, "Alternating Current Machines". (5 class hours, 3 laboratory hours.)

AST. 414. Electric Circuits.

Potentiometer and ladder circuit, instantaneous current and power, effective e.m.f. and current, average power, series and parallel circuits, series and parallel resonance, vector algebra, sinusoidal single-phase circuit analysis, filter circuits, tuning, non-sinusoidal waves, coupled circuits, balanced polyphase circuits. An alternating current course. Laboratory experiments on parallel, series, coupled circuits superposition, Thevinin's theorem, wye-delta networks, one-phase, two-phase, three-phase power circuits, balanced and unbalanced. Laboratory data checked against results calculated from theory. Kerchner and Corcoran, "Alternating Current Circuits". (5 class hours, 6 laboratory hours.)

AST. 415. Electronics and Associated Circuits.

Electron ballistics, thermionic emission of electrons, Child's Law and space-charge operation of electronic devices, gaseous conduction, the Equivalent Plate Circuit Theorem, voltage amplification: Class A, B, and C amplifiers for audio and radio frequency work, feedback amplifiers, oscillating circuits and vacuum tube oscillators; amplitude, frequency, and phase modulation; demodulation and detector circuits. Problems and weekly written tests. Laboratory experiments selected from the text, with written reports. Schultz and Anderson, "Experiments in Electronics and Communication Engineering". (5 class hours, 6 laboratory hours.)

AST. 416. Transients.

Solution by linear differential equations and operational calculus of transient currents and voltages in series, series-parallel; and inductively coupled circuits, containing resistance, inductance and capacitance—with direct and alternating voltages applied. Solutions of circuits containing initial current and voltage conditions included. Extensive problem work is required. Demonstrative laboratory work in which oscillograms of currents and voltages in circuits were made, and checked by use of circuit constants. Kurtz and Corcoran, "Introduction to Electric Transients". (2 class hours, 3 laboratory hours.)

AST. 417. Distributed Constants.

The calculation of inductance, capacitance and resistance for open-wire lines, co-axial lines, and cables, skin effect and proximity effect; the infinite line; the theory of the general long electrical line; open and short-circuited lines; the use of lines as impedance elements, wavemeters, etc., distortion and loading; impedance matching by use of lines, stubs, transformers and network. Problem work and written quizzes. Ware and Reed, "Communication Circuits". (3 class hours.)

ENGLISH

AST. 111, English, consisted of three twelve-week terms, meeting a total of 84 times, roughly the number of meetings in a normal two-semester freshman composition course. The objectives paralleled closely those of standard freshman English. In practice, achievement fell below that in freshman English for three reasons: First, the trainees were less well-prepared than civilian freshmen; therefore more time had to be spent in a review of fundamentals. Second, the Army required instruction in Military Correspondence and Speech; these took much time (detailed below) from the usual freshman English subject matter. Third, assignments for outside preparation were limited to what the trainee could do in one hour. These three restrictions made AST. 111 something less than the equivalent of a normal civilian freshman course in English composition.

As new directives restated the objectives of the course from term to term, so also was the content of the course changed. Following is a summary of the material assigned in each term.

AST. 111a. English. (July to September 1943.)

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Sections C, D, E, F, 1, 6, 7, 10, 15, 17, 18, 22, 23, 33, 34, 35, 36, 37. (Review of grammar and fundamentals of composition.) Wright and Swedenberg, "The American Tradition". Selections beginning on pp. 3,

13, 16, 18, 25, 38, 42, 48, 84, 86, 129, 141, 160, 199. (Total, 73 pp.) Brembeck and Rights, "Speech for the Military". Projects 1-5. (Each student made five prepared and at least three impromptu speeches.) Nine expository themes, correlated with assignments in Jones or Wright and Swedenberg. (3 class hours.)

AST. 111a. English. (October to December 1943.)

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Sections C, D, E, F, 1, 10, 15, 17, 18, 22, 23, 31, 33, 34, 35, 36, 37. Wheat, Clayton E., "The Democratic Tradition in America". Selections beginning on pp. 5, 9, 11, 23, 25, 28, 31, 34, 36, 55, 253, 335, 337, 342, 371. Brembeck and Rights, "Speech for the Military". Projects 1-5. "Military Correspondence". Four class periods spent on AR 340-15 and writing simple military letters. Nine expository themes, correlated with assignments in Jones and Wheat. (3 class hours.)

AST. 111b. English. (October to December 1943.)

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Sections 1, 2, 13, 14, 38, 39, 43, 44, 45, 46, 47, 50. Wright and Swedenberg, "The American Tradition". Selections beginning on pp. 44, 52, 59, 81, 91, 120, 264, 367, 418. Brembeck and Rights, "Speech for the Military". Projects 6, 7. Six expository themes, correlated with assignments in Jones and Wright and Swedenberg. (2 class hours.)

AST. 111a. English. (January to April 1944.)

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Sections 1, 10, 11, 12, 13, 14, 15, 17, 18, 22, 23, 25, 36, 37, 43, 44, 45, 46, 47, 48. Wright and Swedenberg, "The American Tradition". Selections beginning on pp. 3, 81, 160, 264, 522. "Military Correspondence". Six class hours spent in study of AR 340-15 and of the construction of simple military letters. Six epository themes, correlated with assignments in Jones or Wright and Swedenberg. No speech in this term. (3 class hours.)

AST. 111b. English. (January to April 1944.)

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Review of sections 10, 15, 17, 18, 22, 23, 37. Study of sections 13, 12, 14, 38, 39, 43, 44, 45, 46, 47. Wheat, "The Democratic Tradition in America". Selections beginning on pp. 152, 196, 253, 324. Brembeck and Rights, "Speech for the Military". Projects 5, 7. Six expository themes, correlated with assignments in Jones and Wheat. (2 class hours.)

AST. 111c. English. (January to April 1944.)

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Review of sections 10, 11, 12, 14, 15, 17, 18, 22, 23, 25; study of sections 20, 21, 26, 27, 28. Wright and Swedenberg, "The American Tradition". Selections beginning on pp. 67, 245. Brembeck and Rights, "Speech for the Military", Projects 9, 10, 11. Five expository themes correlated with assignments in Jones and Wright and Swedenberg. (2 class hours.)

AST. 111b. English. (April to July 1944.)

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Sections 10, 12, 15, 17, 18, 20, 22, 23, 27, 28, 29, 30, 37, 38, 45, 50. Wright and Swedenberg, "The American Tradition". Selections beginning on pp. 245, 249, 451, 511, 538, 551, 554. Speech was experimentally correlated with discussion of the reading in "The American Tradition". Ten expository themes correlated with assignments in Jones and Wright and Swedenberg. (2 class hours.)

AST. English (Refresher). (August 23 to October 2, 1943.)

The students taking this course were judged by the military authorities worthy of continuation in the program, but were grossly unprepared to handle English at anything approaching college level. The work set up for them by the English Department was at a simpler and more basic level than the University's civilian Engl. O. Elementary composition (non-credit, three-hour, one-semester review of high school grammar and composition).

Assignments: Jones, Easley S., "Practical English Composition", 3rd ed. Sections E, 6, 7, 8, 10, 15, 17, 18, 20, 22, 23, 25, 27, 29, 37. Study of these assignments was supplemented by original exercises based on the text and directed toward the needs of the students. Four expository themes, intensively analyzed and revised in class. (3 class hours per week for six weeks.)

GEOGRAPHY

The prescribed contents of courses AST. 163a and AST. 163b, Geography, were, for the trainees in the Basic Engineering Curricula entering in July and October 1943, presented under an arrangement in which the Geology Department met the classes one hour per week and the Economics Department one hour per week over a period of two terms. Thus the work of either term did not complete the syllabus requirements for that term, but the combined content of both terms completed the full requirements of each of the terms indicated by the ASTP syllabus for these two courses. The group beginning in July 1943 completed the combined AST. 163a and 163b, Geography, in January 1944 and continued with AST. 163c, Geography, for the third term. The group arriving in October 1943 completed the two term combination course in March 1944. The group arriving in January 1944 met with the Geology Department two hours per week for course AST. 163a, Geography, and will continue with AST. 163b, Geography, beginning in April 1944, two hours per week, taught by the Economics Department, thus completing each term's work according to the ASTP syllabus.

AST. 163a. Geography. (July to September 1943, October to December 1943.)

Population distribution; climatic regions, vegetation, animal life; space relations, area, size, location; transportation, inland waterways, railways, air routes, highways, ocean carriers; hunting and fishing; grazing and dairying. Davis, "Earth and Man", chapters 1, 2, 5, 12, 19, 21, 22, 23, 29, 30; appropriate maps in Appleton, "Modern School Atlas". Taught by the Economics Department. (1 class hour.)

Climate and weather; rock weathering; soils; running water; ice and wind; underground water, lakes, land forms; the physiographic cycle. Davis, "Earth and Man", chapters 8-11, 14, 16, 17, 36, 37; Appleton, "Modern School Atlas", pp. 6, 7, 14-16, 20, 21, 64, 94. Taught by the Geology Department. (1 class hour.)

AST. 163b. Geography. (October to December 1943, January to March 1944.)

Occidental agriculture; oriental agriculture; plantation agriculture; the timber industries; the mineral industries; water power; major manufacturing industries; world trade and trade routes. Davis, "Earth and Man", chapters 15, 24, 25, 26, 27, 28, 31, 32, 33; appropriate maps in Appleton, "Modern School Atlas". Taught by the Economics Department. (1 class hour.)

Physiography and man; minerals and rocks; mineral products; distribution of mineral wealth; the oceans, marine environment; cartography; topographic maps; chronology. Davis, "Earth and Man", chapters 18, 19, 34, 35; Appleton, "Modern School Atlas", pp. 1-5, 7, 12, 22-23, 72, 73, 91-94; the United States Geological Survey, Allentown topographic map, was also used. Taught by the Geology Department. (1 class hour.)

AST. 163a. Geography. (January to March 1944.)

Chronology; weather; rock weathering; soils; land forms; population distribution; climate; climatic types; ice and wind; rivers; the physiographic cycle; surface waters; underground water; the oceans, marine environment rocks; minerals and mineral products; strategic minerals; cartography; topographic maps. Davis, "Earth and Man", chapters 1-20, 34-36; Appleton, "Modern School Atlas", pp. 1-9, 14-17, 20-33, 72, 73, 91-94; the United States Geological Survey, Allentown topographic map, was also used. Taught by the Geology Department. (2 class hours.)

AST. 163c. Geography. (January to March 1944.)

Population distribution; predominant economies; size, space, shape, and location as factors in national policies; the Great Powers as of 1937-38, climate, resources, boundaries, topography, communications, critical areas, demographic factors; productive capacity, colonies. Latin America. The military campaigns of 1939-1942 in terms of geographic factors. The U.S. at war, geographic factors in American policy and strategy. Van Valkenburg, "Elements of Political Geography"; Appleton, "Modern School Atlas". Taught by the Economics Department. (2 class hours.)

HISTORY

AST. 133a. American History.

European background of American history; English colonies in America—corporate, proprietary, and crown; the Navigation Acts; Colonial and European Wars; French and Indian War and the treaty of Paris, 1763; imperial reorganization; causes of the Revolution; War of Independence; the Confederation; the Constitutional Convention, 1787; the Federal Constitution; Washington and the organization of the Federal government; the Federalists and the home front; Washington deals successfully with Great Britain and Spain; the French question and the Convention of 1800. The election of 1800; the Jeffersonian policies—political, economic, and diplomatic. The War of 1812 and its results. The new nationalism, 1815-1820, and the era of good feeling. The Missouri Compromise and the rise of sectionalism in the tariff, internal improvements, public lands and slavery. The cotton kingdom and expansion. The Monroe Doctrine and Manifest Destiny. The Mexican War and the Compromise of 1850. The irresistible conflict—Lincoln, secession and the civil war. Reconstruction—political, economic, and constitutional. Railroads and their control; the spoil system and civil service reform; big business and anti-trust legislation. The Greenback movement; the silver interest; the Granger movement; the Populist Party; organized labor; and immigration. The Spanish-American War and its results. The presidency of Theodore Roosevelt and the administration of Taft. The election of 1812 and Wilson's first term. The causes of World War I; the entry of the United States into the war; the treaty of Versailles; the Senate and the League covenant. Harding and the Washington Disarmament conference; the Coolidge era; Hoover and the Great depression; Pan-Americanism and the Good Neighbor policy. The first three administrations of Franklin D. Roosevelt—internal, political, and diplomatic. The causes of World War II; the United States enters the war; the international conferences, 1941-1944. Faulkner, "American Political and Social History of the United States". (3 class hours.)

AST. 133b. World History Since 1919.

Analysis of recent developments in history and international relations, since 1919, with emphasis upon the roles of the Great Powers in world politics; peace settlements following the War of 1914-1918; the search for security through disarmament, the League of Nations, the World Court, European Union; economic nationalism; new ideologies; and the road to another war. Roucek, "Contemporary Europe", selected chapters. (2 class hours.)

AST. 133c. American Government (National).

The colonial background and the Articles of Confederation. The adoption of the Constitution and its subsequent development. The distribution of powers between the national government and the states, the supremacy of the national government, and the position of the states. Citizenship and civil rights. Nomination and election of the President and members of Congress. The powers and duties of the President and Congress. The

Federal judicial system. National administration, the executive civil service, national finance, foreign and interstate commerce, foreign relations, national defense and war-time government. Emphasis upon the machinery and processes of government. Ogg and Ray, "The Essentials of American Government, the National Government". (2 class hours.)

MATHEMATICS

AST. High School Algebra (Refresher). (August 23 to October 2, 1943.)

A refresher course in high school algebra to which trainees found to be deficient in algebra were assigned. (3 class hours, for six weeks.)

AST. Plane Geometry (Refresher). (August 23 to October 2, 1943.)

A refresher course in plane geometry accompanying the foregoing course in high school algebra. (3 class hours, for six weeks.)

AST. 401. Integral Calculus.

Nelson, Folley, and Borgman, "Calculus", beginning with chapter 12 to completion of the book. (5 class hours.)

AST. 403. Engineering Mathematics.

Sokolnihoff, "Higher Mathematics for Engineers and Physicists", chapters 1, 2, 3, 5, 6 with selected portions of chapters 4, 7, and 10. (3 class hours.)

AST. 406. Algebra and Trigonometry.

Peterson, "Intermediate Algebra"; Rickey and Cole, "Trigonometry". Essentially all material in these two books was covered in this course, exclusive of the portion on spherical trigonometry. (6 class hours.)

AST. 407. Analytic Geometry.

Young, Fort, and Morgan, "Analytic Geometry". All material in this book was covered except the portion on "Introduction to Calculus", with certain supplementary additions—notably a more complete discussion of transcendental functions. (5 class hours.)

AST. 408. Differential Calculus.

Nelson, Folley, and Borgman, "Calculus". The text was completed through chapter 11, with certain minor omissions. (5 class hours.)

AST. 406-407-408. Algebra, Trigonometry, Analytic Geometry, Differential Calculus.

This course gave in more hurried form the same material as covered in AST. 406, 407, and 408 and used the same textbooks. (10 class hours.)

AST. 406-407-408. Algebra, Trigonometry, Analytic Geometry, Differential Calculus.

This course was the same as the ten-hour course above except that a slightly more accelerated pace was followed. (9 class hours.)

MECHANICAL ENGINEERING

AST. 326. Mechanisms and Power Transmission.

An elementary study of kinematics and empirical design of linkages, gears, shaft, and other mechanical methods of transmitting power, the lubrication of power transmitting devices. A study of velocities, motion, and accelerating methods of transmitting motion, including linkages, cams, gears, belts, clutches, idler gears, reversing mechanism, and differentials. Characteristics of lubricants and their use in modern bearings. Theoretical advantages and limitations of automotive power transmission devices. Guillet, "Kinematics of Machines"; Ordnance Department, United States Army, "Lubrication of Ordnance Material". (3 class hours, 4 laboratory hours.)

AST. 335. Thermodynamics.

For description see under Chemical Engineering and Chemistry.

AST. 336. Internal Combustion Engines.

Theoretical background of the principles of internal combustion engines. Practical operating problems for all types of internal combustion engines from the small single cylinder engines driving small pumps, electric generators, and compressors to the large truck and tank engines used by the Army Ground Forces. Engine parts, functional and general dimensional relationships. Spark-ignition four-stroke and two-stroke Otto cycles, gasoline and its properties, combustion of fuels, carburetion (float chamber and pressureized), mixture requirements and explosive limits, ignition systems, spark and timing adjustments, combustion and flame travel, detonation and factors affecting detonation, detonation suppressors, octane number, engine performance characteristics, torque, power and fuel economy, throttled operation, effects of fuel octane number, adjustments and conditions on performance.

Compression-ignition engine, Diesel cycle, Diesel fuels and properties, fuel injection systems, mixture requirements, smoke limit, combustion chambers, Diesel knock, octane number and factors affecting knock, engine performance characteristics, torque, power and fuel economy, effect of fuel quantity, injection timing and cetane number of fuel.

Valve gear and valve timing, heat transfer, cooling systems, coolants and characteristics, engine lubrication, lubricant properties and characteristics, bearing and adjustments, supercharging, effect on performance, desirable compression ratio, octane and cetane requirements, air and lubricant filters, cold starting requirements. Polson, "Internal Combustion Engines"; Jackson, "I. C. E. Laboratory Manual". (3 class hours, 4 laboratory hours.)

AST. 401. Mechanics.

For description see under Civil Engineering.

AST. 401. Thermodynamics.

Gas law: The ideal gas equation of state; the gas constant, universal and individual; pressure-volume, temperature-volume, and pressure-temperature diagrams. Energy and the energy law: heat and work; specific heats and their ratio and difference; adiabatic processes; polytropic processes; air compression and the compressed air engine.

The Carnot cycle, as the standard of excellence, as the basis of the absolute scale of temperature, and as the index of ideal availability. Entropy and unavailability; the temperature-enthropy diagram; reversibility; the heat pump. The Brayton, Otto, and Diesel cycles, with brief mention of their execution in internal combustion engines and the gas turbine. Steady flow processes and equations (energy and continuity). The enthalpy-entropy and enthalpy-volume diagrams. Nozzles for metering, for the jet pump and for the turbine.

Liquids and vapors: two-phase states; steam tables and charts; steam power; vapor refrigeration. Mixtures of gases and of gas vapor: Dalton's law of partial pressures; gas analysis; atmospheric humidity; psychrometric chart; air conditioning. Kiefer and Stuart, "Principles of Engineering Thermodynamics"; Keenan and Keys, "Properties of Steam". (5 class hours.)

AST. 402. Kinematics.

Composition and resolution of vectors; relation between linear and angular displacement; velocities; accelerated rectilinear motion; tangential and normal acceleration; relative motion. Transmission of motion; kinematic chains; nature of rolling and sliding; conditions for pure rolling; positive driving. Analysis of plane motion; linear and angular velocities; velocity and acceleration graphs. Cams; displacement, velocity and acceleration graphs. Rolling curves and friction gearing. Straight and helical spur gears; terminology; forms of teeth; interchangeability; interference of involute teeth; specific sliding and velocity of sliding; selection of cutters; strength, wear and noise of gear teeth; internal involute gears. Methods of cutting and generating straight and helical spur gears. Straight and spiral bevel gears. Helical and hyperboloidal gears. Worm and worm wheel. Linkwork and miscellaneous mechanisms; four-link; slider crank; quick return; straight line; pantographs; Hooke's coupling; ratchets and escapements. Belt, rope and chain transmission; belt tension and power; length of belt; cone pulleys; speed cones; V-belt drives; rope drives; transmission chains. Trains of mechanism: sliding gears; clutches, idler gears; reversing mechanisms; change gear mechanism; wheel trains; cyclic trains; reverted cyclic trains. Guillet, "Kinematics of Machines". (3 class hours, 3 laboratory hours.)

AST. 405. Internal Combustion Engines.

Principles of the design, construction and operation of internal combustion engines. Laboratory work to familiarize the students with the

operation and adjustment of the internal combustion engine, and the calibration and use of instruments for measuring pressure, temperature, power, velocity, quantity of material, gas composition, etc. Simple tests on engines, centrifugal pumps, fans, and the like. Polson, "Internal Combustion Engines"; Jackson, "I. C. E. Laboratory Manual". (3 class hours, 3 laboratory hours.)

AST. 406a. Shop Practice.

Objective: This laboratory course in shop theory and practice was intended not to produce manual skill but to acquaint the student with the principles of operation, capabilities, and limitations of the machine tools; and processes used in the construction, maintenance, and repair of mechanical equipment in order that he may be better qualified to supervise the maintenance and repair of military equipment in the field.

The course content included: (1) theory and practice of welding by gas and electric arc; limitations and applications to construction repair; (2) forging and heat treating of small parts; (3) hand tools and bench work including use of the hammer, file, chisel, taps, and dies; (4) sheet metal layout, cutting and forming; (5) theory and operation of machine tools. Lathes, milling, machines, shapers and planners, grinders; (6) measurement and measuring instruments such as scales, calipers, gages, micrometers, verniers. Henry Ford Trade School, "Shop Theory". (3 laboratory hours.)

AST. 406. Shop Practice.

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AST. 408. Machine Design.

Stresses in machine parts; properties of materials; screw fastenings; keys, small pins and cotters; systems of fits with tolerances and allowances; welded joints; springs; bearings and their lubrication; brakes; screws for power transmission; shafts; couplings; belt drive; chain drive; crank shafts; flywheels; friction gearings; toothed gearing; machine frames. Fairies, "Design of Machine Elements". (3 class hours, 6 laboratory hours.)

AST. 410. Mechanical Vibrations.

Kinematics of vibration, harmonic and non-harmonic; systems of single, two, and many degrees of freedom; free and forced vibrations, with and without damping, applications, slider crank mechanisms, rotative machinery, balancing. Self-excited vibrations, non-linear characteristics, vibration measuring instruments, balancing machines. Freberg and Kemler, "Elements of Mechanical Vibration". (3 class hours).

AST. 410. Internal Combustion Engines.

Fuels and combustion: petroleum products and properties; combustion mixture requirements; explosive limits. Heat transfer by radiation, conduction and convection. Spark ignition engine; Otto cycle; standard air cycle; fuel-air cycle; carburetion (float and pressurized); combustion and flame travel. Detonation and detonation suppressors; heat transfer; valve gear and valve timing; ignition systems and spark timing; gear and turbo supercharging of aircraft engines; engine performance characteristics. Compression ignition engine; Diesel cycle; fuel injection systems; combustion and combustion chambers; Diesel knock; injection timing; Diesel supercharging; engine performance characteristics. Gas turbines: gas turbine cycles, closed and open; heat exchangers; fuels and combustion chambers; temperature and pressure limitations; effect on efficiency of turbine, compressor and heat exchanger performance. Polson, "Internal Combustion Engines". (6 class hours.)

AST. 411. Internal Combustion Engines Laboratory.

The object of this course was to give trainees familiarity with the operation and adjustment of the internal combustion engine, and to show them the influence of various operating conditions. Performance tests of spark ignition and Diesel engines on dynamometer. Effects on capacity and efficiency of speed, throttle opening, fuel-air mixture. Fuel rating by C. F. R. engine. Jackson, "I. C. E. Laboratory Manual". (4 laboratory hours.)

AST. 420. Mechanical Engineering Laboratory.

The object of this course was to familiarize the trainee with the instruments and techniques used in studying the performance of mechanical equipment, and to acquaint the student with the principles of operation and with the performance of such equipment through direct contact. Calibration and use of instruments for measuring pressure, temperature, power, velocity, quantity of material, gas composition, etc. Simple tests on engines, centrifugal pumps, fans and the like. Jackson, "Laboratory Manual"; Keenan and Keys, "Thermodynamic Properties of Steam". (3 laboratory hours.)

AST. 406. Engineering Drawing.

Detail and assembly drawings: Simple mechanisms and machines—representation, idioms, conventions, specifications and reading. Empirical drawings and charts. Jigs and fixtures (basic principles). Carter and Thomson, "Engineering Drawing". (4 laboratory hours.)

METALLURGY

AST. 430. Metallography and Heat Treatment.

A condensation of the fields covered by Met. 130, Physical Metallurgy, and Met. 131, Metallography, with emphasis on the more practical aspects. The structure of metals, cold forming, hot forming, fatigue, prediction of microstructures, heat treatment, etc. Doan and Mahla, "Principles of Physical Metallurgy". (4 class hours.)

MILITARY TRAINING

First Term Basic Military Course.

The articles of war, especially the so-called punitive articles of war, with the particular object of obtaining the cooperation of the individual in living up to established regulations and rules; the fundamental organization of the Army and its different components; military courtesy and essential customs in military service; military sanitation and sex hygiene; the use of the first-aid packet and proper procedure in rendering first-aid treatment to wounded men; interior guard duty, and the dignity and responsibility of a guard as a protection of a command as a whole; care of clothing and equipment; making and wearing the pack; pitching shelter tents; safeguarding military information; principles of foot marching, march discipline, march hygiene, and march sanitation; training and defense against chemical, air, and mechanized attack; care and manifestation of the rifle and correct principles of marksmanship; infantry drill. (2 class hours, 1 rifle hour, 1 drill hour, 1 study hour.)

Second Term Basic Military Course.

Defense against enemy mechanized vehicles; recognition of U. S. mechanized vehicles; providing initial hasty shelter under fire; night operations under combat conditions; rifle instruction; tactics of small units; infantry drill. (2 class hours, 1 rifle hour, 1 drill hour, 1 study hour).

Third Term Basic Military Course.

Individual security, concealment and cover, and scouting and patrolling; defense against chemical attack; defense against air attack; recognition of U. S. airplanes; map reading and aerial photographs; rifle instruction; infantry drill. (2 class hours, 1 rifle hour, 1 drill hour, 1 study hour).

First Term Advanced Military Course.

Drill and ceremonies to perpetuate the habits of precision to leader's orders and to develop qualities of leadership in trainees detailed to command positions; the direction and control of rifle fire; tactical principles and application to fit trainee to perform the duties of a platoon commander of a rifle company; application of military law; elements of leadership; estimate of the situation; combat orders; reconnaissance; map reading and interpretation of aerial photographs. (2 class hours, 1 rifle hour, 1 drill hour, 1 study hour).

Second Term Advanced Military Course.

Drill and ceremonies; offensive combat, plans and orders; special operations; defense combat; administrative duties of a company officer, including a practical working knowledge of the various reports and forms in daily use; the powers, characteristics, and limitations of associated arms; principles of mess management. (2 class hours, 1 rifle hour, 1 drill hour, 1 study hour).

Third Term Advanced Military Course.

Drill and ceremonies; organization of ground-field fortifications; retrograde movements; signal communications; combat intelligence; supply; interpretation of training programs and schedules to improve trainee's ability to train others. (2 class hours, 1 rifle hour, 1 drill hour, 1 study hour).

PHYSICAL TRAINING

The Department of Physical Education conducted a varied and intensive program for trainees. The schedule called for six hours of training per week, which consisted of three periods of two hours each. The department followed a sound program of a great variety of strenuous calisthentics, guerrilla exercises, grass drills, relays, and various types of running, as set up by the Army. Included in the general conditioning program were aquatics (non-swimmers', functional swimming, and Red Cross life-saving courses), wrestling, boxing, fencing, personal defense, gymnastics, and team sports (which consisted of touch football, softball, soccer, volleyball, and basketball.) In addition, intramural basketball and other sports were encouraged, and a basketball team represented the unit in playing other colleges. Tests were given at the beginning and end of each twelve week period to indicate relative progress. The program gave the participants in the shortest possible time an all around training which helped to fit them for their military duties.

PHYSICS

AST. 304. Mechanics.

Mechanics of point masses and of rigid bodies; elasticity, mechanics of fluids. Three class periods, one demonstration lecture, one three-hour laboratory period. Hausmann and Slack, "Physics". (4 class hours, 3 laboratory hours.)

AST. 305. Heat, Sound, and Light.

Wave motion and sound; heat, covering thermometry, calorimetry, kinetic theory, gas laws, thermodynamics; light, covering photometry reflection, refraction, lenses, color, interference, optical instruments. Three class periods, one demonstration lecture, one three-hour laboratory period. Hausmann and Slack, "Physics". (4 class hours, 3 laboratory hours.)

AST. 306. Electricity and Magnetism.

Electrostatics, current electricity, Ohm's law, electric circuits, electromagnetism, induced electromotive forces, etc. Three class periods, one demonstration lecture, one three-hour laboratory period. Hausmann and Slack, "Physics". (4 class hours, 3 laboratory hours.)

AST. 304-305-306. Physics (Refresher).

A complete survey of Hausmann and Slack, "Physics", covering the topics of AST. 304, 305, and 306 in review. Six recitation periods, one special problem period, one demonstration lecture, one three-hour laboratory period per week for twelve weeks,—eleven contact hours per week. Mechanics, 21 class periods; heat and sound, 17 class periods; light, 18 class periods; electricity, 28 class periods. (8 class hours, 3 laboratory hours.)

AST. 305-306. Physics (Refresher).

A combined course covering the topics of AST. 305 and 306 in one term. Trainees attended the recitations and demonstration lectures of courses 305 and 306, but only one three-hour laboratory exercise per week. (8 class hours, 3 laboratory hours.)

Foreign Area and Language

ECONOMICS AND SOCIOLOGY

AST. 710. Economics and Sociology.

The first term of a three-term course dealing generally with the economic and social institutions of Germany and France, treated historically and analytically. This term dealt primarily with pre-Hitler Germany, the economic and social conditions which gave rise to Hitler, and the regimentation of life and industry by the Nazi regime. Am. Geog. Soc., "Readings in the Geography of France, Germany, Flanders, and the Netherlands". (3 class hours.)

AST. 266. Economics and Sociology.

Continuation of AST. 710, covering for Germany the density and racial composition of the population; fertility and resources; the character of industry, agriculture, trade, and currency; wage levels and the standard of living, and the economics of "lebensraum". Am. Geog. Soc., "Readings in the Geography of France, Germany, Flanders, and the Netherlands". (2 class hours.)

AST. 267. Economics and Sociology.

Continuation of AST. 266, covering for France the phenomena covered for Germany in the preceding term, with special emphasis on the conditions created by the "Popular Front" legislation. The economic conditions of Germany and France were contrasted with those of England, the United States, and other nations. Bloch and Hoselitz, "Economics of Military Occupation"; Am. Geog. Soc., "Readings in the Geography of France, Germany, Flanders and the Netherlands". (2 class hours.)

FRENCH

Upon admission, trainees were assigned to either elementary or intermediate sections on the basis of their competency in French. Elementary groups comprised those trainees with little or no previous knowledge of French. Intermediate groups presupposed two or more years of formal study of French.

AST. 756. French Grammar and Conversations: Elementary.

Exposition of French pronunciation, stressing vocabulary of two thousand cognates, and five hundred of commonest French words and expressions. Rapid introductory survey of entire French Grammar, followed by an intensive oral, and more detailed grammatical presentation. Classes conducted in French. Richardson, "Outline of French Grammar"; Chinard, "Scènes de la vie française"; Barthold, "Student's Practical Manual of French Pronunciation". (7 class hours, 10 laboratory hours.) (First term.)

AST. 756. French Grammar and Conversation: Intermediate.

Grammar review and oral composition. Discussion of the topography, history, manners, customs, and literature of principal regions of France and her Colonies. Conducted in French. Célières and Palamountain, "Refreshing Your French"; Morize and Rice, "Introduction to France". (7 class hours, 10 laboratory hours.) (First term.)

AST. 216. French Grammar and Composition: Elementary.

Increasing emphasis on oral comprehension and expression of colloquial French. Newspaper articles and popular one-act plays form basis for conversation and discussion. Pargment, "Initiation à la langue Française"; Chinard, "Scènes de la vie française"; A.A.T.F., "Materials for a War Course in French"; Schwartz, "Lever de Rideau". (5 class hours, 10 laboratory hours.) (Second term.)

AST. 216. French Grammar and Composition: Intermediate.

Texts and assigned outside reading of source material on such subjects as food and drink habits, types of dress and climate, folkways and customs, types of dwellings, furniture, etc., town and city layouts, taboos

and conventions, popular amusements, popular literature, public health and sanitation. Conducted in French. Célières and Palamountain, "Refreshing Your French"; Morize and Rice, "Introduction to France"; Sheffer, "Aspects de La Guerre Moderne". (5 class hours, 10 laboratory hours.) (Second term.)

AST. 217. French Grammar and Conversation: Elementary.

Increased use of newspapers and magazines, stressing political and military articles for vocabulary building. Assigned subjects for special research and oral report, such as telephone, railroads, aviation, etc. Conducted in French. Chinard, "Scènes de la vie française"; French newspapers: "Pour la Victorie"; "France-Amérique". (5 class hours, 10 laboratory hours.) (Third term.)

AST. 217. French Grammar and Conversation: Intermediate.

Continued use of newspapers and magazines. Oral reports on contemporary Frenchmen prominent in literary, political, and military life of France. Conducted in French. Morize and Rice, "Introduction to France"; French newspapers: "Pour la Victorie"; "France-Amérique". (15 contact hours.) (Third term.)

GEOGRAPHY

AST. 266. Geography — Maps.

A course in map interpretation. Discussion and laboratory exercises, with relatively little lecturing. With a standard United States Geological Survey topographic quadrangle map as a basis, trainees were instructed in such elementary principles as location, distance, elevation, culture, orientation, gradient, and visibility. There followed a study of many U. S. topographic maps illustrating specific physiographic conditions such as might be encountered in the field: rivers and humid regions, regional erosion by streams, drainage patterns, characteristics of arid regions, wind work, underground water, regions of continental glaciation, of alpine glaciation, shore line features, and geologic structural control of topography. In all instances the military importance or possible application of the features discussed was emphasized. Taught by the Geology Department. (1 class hour.)

AST. 267. Geography — Maps.

A continuation of AST. 266. A study of topographic maps from which the printing of the culture had been omitted, leaving only topography and water, in which study trainees learned to recognize and interpret physiographic features without dependence upon printed information. Practice was most specific in recognizing the physiographic condition or conditions illustrated in each map. While it was appreciated that the men were not necessarily conversant with geology, an under-

standing of the meaning and interpretation of geologic maps was deemed important because of the close kinship between certain phases of geology and military operations, including the relationship of rock types to physiography, soils, drainage patterns, and other matters. Map projections; aerial photographs and photogrammetry, including instruction on how aerial photographs are taken, mosaics prepared, and military interpretations of the finished photographs made. Army topographic maps of parts of North Africa, France, Germany, and Belgium. In addition, other foreign maps, topographic, geologic, and political, were studied for comparison with and contrast to the more familiar American maps. Some differentiations in subject matter were made, chiefly in emphasizing the geology and physiography of France for trainees in French and the same aspects in Germany for trainees in German. Taught by the Geology Department. (1 class hour.)

AST. 710. Geography.

Germany as a state in the field of political geography: Germany as an industrial power; colonial interests; German minorities in the new states of Europe; economic outlook. Germany in regional and world politics: geographic, economic, and demographic factors. Germany as a state, a part of modern global influence. Emphasis upon climate, land forms, water supply, vegetation, animal life, accessibility, logistics, demography. Lectures, map studies. Whittlesey, "The Earth and the State". Taught by the History Department. (3 class hours.)

AST. 266. Geography — Place.

Geographical influence of France: political and colonial aims of France, special colonial interests of France. World politics and French geography: geographic, economic, and demographic factors. France and the Earth: alternation of division and union, the internal pattern, the Rhine basin and buffer politics, the eastern boundary, the unity of France. Emphasis upon climate, land forms, water supply, vegetation, animal life, accessibility, logistics, demography. Lectures, map studies. Whittlesey, "The Earth and the State". Taught by the History Department. (2 class hours.)

AST. 267. Geography — Place.

The Lesser or Periphery States of Europe. Peninsular relations of Europe: Belgium and Holland, Spain and Portugal, Italy, Scandinavian countries, Switzerland, Austria, Hungary, Czechs and Slovaks, Jugo-Slavia and the Adriatic, Roumania, Bulgaria, the Albanian region. World politics and French-German hegemony. The area of Central Europe influence: the concept of the exploitable world, the political area, the law and regions, geopolitical forces, observations on political geography, services rendered by political geography. Emphasis on climate, land forms, water supply, vegetation, animal life, accessibility, logistics, demography. Lectures, term papers, map studies. Whittlesey, "The Earth and the State". Taught by the History Department. (2 class hours.)

GERMAN

Upon admission, trainees were assigned to either elementary or advanced sections on the basis of their competency in German. Elementary groups comprised those trainees with little or no knowledge of German. Advanced groups presupposed two or more years of formal study of German.

AST. 756. German: Elementary.

An intensive course aiming at proficiency in speaking and understanding German. Seventeen contact hours per week. Six class hours devoted to study of the structure of the language, to pronunciation, to oral practice. Ten hours of language laboratory, in which small groups were drilled in speaking the language and in aural comprehension of the spoken language. One hour per week for testing purposes. Trainees were assigned to sections on the basis of their competency in the language upon admission. Burkhard, "Sprechen Sie Deutsch"; Koischwitz, "Bilderfibel". (7 class hours, 10 laboratory hours.)

AST. 756. German: Advanced.

Same as for elementary German. Appelt and Hanhardt, "Deutsches Leben"; Alexis and Pfeiler, "In der deutschen Republik". (7 class hours, 10 laboratory hours.)

AST. 216. German: Elementary.

A continuation of AST. 756. Five hours devoted to the structure of the language, with oral practice in the application of the grammar studied. Ten hours of conversation in small groups. Koischwitz, "Bilderfibel"; Alexis and Pfeiler, "In der deutschen Republik"; Jordan, "Deutsche Kulturgeschichte". (5 class hours, 10 laboratory hours.)

AST. 216. German: Advanced.

Same as for elementary German. Jordan, "Deutsche Kulturgeschichte". (5 class hours, 10 laboratory hours.)

AST. 217. German: Elementary.

A continuation of AST. 216. Three hours devoted to study of and drill in the structure of the language, two hours to translation of military German, ten hours to conversation in small groups. Alexis and Pfeiler, "In der deutschen Republik"; Jordan, "Deutsche Kulturgeschichte"; Pusey, Steer, and Morgan, "Readings in Military German." German newspapers (e. g. New Yorker Staatszeitung) were used to supplement the textbooks, to some extent in AST. 216 and more extensively in AST. 217. (5 class hours, 10 laboratory hours.)

AST. 217. German: Advanced.

Same as for elementary German. Pusey, Steer, and Morgan, "Readings in Military German." The textbooks were extensively supplemented by the use of German newspapers in AST. 216 and 217, and also by means of materials and projects presented or initiated by the instructors (e. g. publication of a weekly journal in AST. 217). (5 class hours, 10 laboratory hours.)

GOVERNMENT

AST. 710. The Government of Germany.

The principal stages in the political and constitutional development of Germany. The German Empire, 1871-1918: the distribution of powers between the Imperial Government and the states; organization of the Imperial Government; organization of the state governments. The Weimar Republic, 1919-1933: the Constitution, the Reich, and the states; organization of the Reich Government and the governments of the states. The Third Reich, 1933 to the present: organization of the Reich Government; the position of the states. Political forces and party alignments under the Empire, the Republic, and the Third Reich. German law, the courts, and judicial procedure. Local government: units of local government, their organization and functions, and relations with national and state authorities under the Empire, the Republic, and the Third Reich. The German civil service. Public finance. Shotwell, "Governments of Continental Europe". (3 class hours.)

AST. 266. The Government of France.

French political history: before the French Revolution and from the Revolution to the establishment of the Third Republic. The Third Republic: constitutional laws of 1875; constitutionalism and civil liberty; organization and functions of the national government. The Petain or Vichy Regime: features of the governmental system. Political parties and politics. French law, the courts, and judicial procedure. Local government: the tradition of centralization; units of local government, their organization and functions, relations with national authorities, the government of Paris and the Department of the Seine. The French civil service. Public finance. Shotwell, "Governments of Continental Europe". (3 class hours.)

AST. 267. The Governments of Norway, Denmark, and Belgium.

The governmental systems of Norway, Denmark, and Belgium, covering such topics as the political and constitutional history of each country, the organization and functions of the national government, political parties and politics, law, the courts and judicial procedure, local government, the civil service, and the effects of German occupation. Shotwell, "Governments of Continental Europe". (3 class hours.)

HISTORY

AST. 134. Contemporary History 1914 to the Present (World Affairs).

Early political organization in Greek and Roman times; feudalism; the rise of the modern State; States in the family of nations; the formulation and execution of foreign policy; international law; geography and geopolitics.

AST. 202. Contemporary History 1914 to the Present (World Affairs).

Typical problems of international concern: crime (piracy; liquor control; slavery and the slavetrade; forced labor; counterfeiting currency; traffic in women and children; narcotics; extradition); communications (seas and straits; canals; safety at sea; shipping policy; rivers; railroads; highways; aviation; posts; cables; telephone; telegraph; radio); rivalries in trade and commerce; protection of nationals; conservation of resources; the population problem; minorities. (2 class hours.)

AST. 203. Contemporary History 1914 to the Present (World Affairs).

Intensive study of problems of disarmament: practicality; The Hague Agreements; Paris, 1919; Washington, 1922; Geneva Protocol, 1924; Rome, 1924; Geneva, 1927; League Preparatory Commission; Russian Proposals, 1927-28; Anglo-French Accord, 1928; London, 1930; achievements thus far; General Conference, 1932; "issues of parity and equality"; London, 1936; rearmament. (2 class hours.)

MILITARY TRAINING

For a description of the courses in military training to which Foreign Area and Language trainees were assigned, see the course descriptions under "Basic and Advanced Engineering".

PHYSICAL TRAINING

The trainees in Foreign Area and Language followed the same physical training program as those in Basic and Advanced Engineering, described on a preceding page.

SPECIAL LECTURES

In addition to the regular classroom and conversation work of the Foreign Area and Language instruction, certain special lectures in English, French, and German were provided as set forth below.

Lecturer	*Topic*	*Date*
Bonn, M. J.	The Essentials of Nazi Economics	January 12, 1944
de Lanux, Pierre	Rôle and Influence of France in the Peace Settlement and Post-war World	March 22, 1944
	The Resistance Movement in France. (Lecture given in French, 4.00 P. M.)	March 22, 1944
Harmon, G. D.	American Foreign Policy International Conferences 1940-44	
Howland, G. A.	French Architecture (Mediaeval Period)	February 9, 1944
	French Architecture (Renaissance and Modern)	February 16, 1944
	German Painting	February 23, 1944
	German Architecture	March 1, 1944
Moss, R. F.	An Appraisal of Japanese Civilization	March 16, 1944
Scholz, Karl	German Public Finance	February 24, 1944
Simons, Hans	Problems of Central European Reconstruction (Lecture given in English—10:00 a. m.)	December 15, 1943
	Political Aspects of Present Day German Administration. (Lecture given in German—4:00 p. m.)	December 15, 1943
Simons, Hans	Economic and Social Results of the National Socialist Administration in Germany (Lecture given in English—10:00 a. m.)	March 15, 1944
	Local and Regional Problems of Military Occupation (Lecture given in German —4 p. m.)	March 15, 1944
Sollmann, Wm. F.	German Labor before and under Hitler	January 26, 1944

General Information

SUMMER SESSIONS

The courses offered during the 1943 summer sessions were arranged in three sessions: (1) a pre-session of four weeks, May 24 to June 19, consisting of courses designed primarily for undergraduates; (2) the regular session of six weeks, June 24 to August 4, consisting of courses offered primarily for graduate students, teachers and adults interested in special college work; (3) a post-session consisting of graduate and professional courses in Education with emphasis on administration. All sessions are open to both men and women.

The following courses were offered in the summer of 1943. The summer session announcement containing a full description of courses to be offered in 1944, and information concerning admission, fees, etc., will be sent to any address, on request to the director of the summer session.

SUMMER SESSION COURSES

PRE-SESSION

May 24 to June 19, 1943

Chem. 8	Stoichiometry	(1)
Chem. 20	Elementary Chemistry and Qualitative Analysis	(3)
Engl. 2	Composition and Literature	(3)
Engl. 9	English Literature	(3)
Fin. 135	Transportation	(3)
Greek 99	Ancient Science	(3)
Math. 12	Analytic Geometry and Calculus	(3)
Math. 13	Calculus	(3)
Math. 14	Intermediate Calculus	(3)
M.E. 100	Theodetical Naval Architecture	(3)
Phys. 22	Mechanics, Properties of Matter and Light	(4)
Phys. 23	Dynamics and Heat	(4)

REGULAR SUMMER SESSION

June 24 to August 4, 1943

Educ. 121	The Diagnosis and Adjustment of Reading Difficulties	(3)
Educ. 253	Secondary School Administration	(3)
Educ. 257	Modern Trends in Teaching	(3)
Educ. 264	Foundations of Curriculum Construction	(3)
Educ. 266	Supervision of Instruction	(3)
Educ. 293	Individual Instruction, Field Work, or Research	(3)
Engl. 125	English Literature of the Romantic Era	(3)

Engl. 141	Biographies of Great Men	(3)
Engl. 220	Graduate Seminar	(3)
Engl. 231	Graduate Thesis	(3)
Journ. 45	The American Press and the War	(3)
Hist. 41	Chinese Civilization and Culture	(3)
Hist. 218	America as a World Power	(3)
Hist. 241	Pennsylvania History, 1683-1765	(3)
M.R.Phil.100	Proseminar (Ethics)	(3)

POST-SESSION

August 5 to August 25, 1943

Educ. 190	Visual Instruction	(3)
Educ. 282	Educational and Vocational Guidance	(3)
Educ. 293	Individual Instruction, Field Work, or Research	(3)
Educ. 296	Seminar. Public School Finance	(3)

PROGRAM IN GENERAL EDUCATION

A program in general education, inaugurated in 1936, provides an opportunity for those students who desire to read either for the purpose of broadening their range of intellectual interests or to pursue some special line of reading not available in regular classroom instruction. Students participating in this program are afforded an opportunity to discuss not only their reading but also their intellectual problems in general with a faculty adviser with whom they come to feel a personal relationship. The independent pursuit of knowledge and the intellectual self-development of the student comprise the aim of the program.

The advisory council for general education, consisting of a group of faculty members with special aptitude for this work, is in charge of the program in general education. Each year the council formally invites the members of the freshman class to apply for enrollment in the program, but any student in the University may at any time apply to the chairman of the council for admission. No university credit toward a degree is allowed for this work and there are no regular hours or assignments. The conduct of the work is entirely at the direction of the student and his faculty adviser. Only those students, however, who appear able to profit by the program are admitted.

There is no fee in connection with the work of the program in general education.

RELIGIOUS OBSERVANCES

Chapel

Voluntary devotional exercises are held at stated times in Packer Memorial Church. Opportunity is given groups of students to arrange chapel programs in conformity with their accustomed modes of religious observance and worship. Any group of students who are members and adherents of any recognized Christian faith may arrange, under the general supervision of the university chaplain, either regular or occasional religious exercises in Packer Memorial Church for themselves and such others as may desire to attend. These assemblies may be held at any appropriate time when those interested may be free to attend and when the church may not be occupied by regular university or other exercises previously scheduled. The university chaplain is glad to cooperate with any such group in making arrangements.

STUDENTS' HEALTH SERVICE

The students' health service has general charge of all health and sanitary measures in the University. The work of the department is organized under four heads: sanitation, physical examinations, dispensary service, education.

SANITATION. The director of the health service is in direct charge of the sanitation of university buildings and grounds, and exercises such supervision as is possible over other accomodations for students.

PHYSICAL EXAMINATIONS. Each student is required to undergo a complete physical examination each year. This examination, which is made jointly by the health service and the department of physical education, serves the needs of both these departments and also complies with the requirements of the Reserve Officers' Training Corps. All physical defects and departures from normal are noted, and the students are divided into groups as follows: (1) those who present no abnormalities and who can proceed with the regular mental and physical work of the University, (2) those who are subnormal rather than abnormal and who should be brought up to normal by the regular courses in physical education, (3) those who require special or corrective treatment.

Students who fall into groups 2 and 3 are observed at regular

intervals, and every effort is made to bring them up to the highest degree of physical development and health. Individual records are kept of the progress of each case.

Dispensary Service. The health service maintains a dispensary in Saucon Hall where students may receive treatment for minor illnesses and injuries. The dispensary hours are from 8:30 a.m. to 12:00 m. on all week days, from 1:30 to 5:00 p.m. on week days except Saturday, and from 10:00 a.m. to 12:00 m. on Sunday. A physician and a nurse are on duty in the dispensary during these hours. While the health service does not furnish medical attendance to students who are sick in their rooms, the directors keep in touch with such cases by telephone and otherwise in so far as is possible in order to see that the students are receiving proper attention and that the time lost from university work is minimized. It is requested that all such cases, together with the names of the attending physician, be reported to the director in order that complete records of the health of the students may be kept.

Education. A course in personal and social hygiene is given to freshman under the joint responsibility of the health service and the department of biology. In this course emphasis is laid on those points of personal hygiene most applicable to the student recently deprived of the atmosphere and influences of home. In social hygiene an effort is made to disseminate correct information concerning the history and present status of social diseases and the effectiveness of approved methods for the relief of existing conditions. This phase of the health service constitutes a specific part of the general program of instruction recommended by the State Board of Health and by other recognized organizations for the promotion of social hygiene.

PLACEMENT BUREAU

The University maintains a placement bureau for the performance of three major functions: student part-time aid, senior placement, and alumni placement.

Although the bureau does not guarantee employment, it is ready to aid students and alumni in every possible way to secure desired work.

STUDENT PART TIME AID. Students who are in need of financial assistance are aided in securing employment on the campus and in the community. Through the cooperation of the faculty and the local merchants, many of the students are able to continue their courses in college, which would not be possible without such aid from the placement bureau.

Seldom can a student, even though he possess unusual mental capacity and physical vigor in addition to extraordinary industry, hope to earn all of his expenses. Even with provision for his tuition, such a student will find it difficult to earn enough to care for his other expenses. An extensive money-earning program is a mistake unless it is absolutely necessary, but a modest program is possible for those students who have determination and the willingness to endure the hardships which accompany such a program.

SENIOR PLACEMENT. During the second semester the placement bureau and the directors of curricula receive the personnel representatives of many industries and business houses, on the campus. These representatives are provided with facilities for interviewing seniors, with the result that a large portion of the seniors secure positions which they assume upon graduation.

In addition to securing interviews on the campus for seniors, many interviews are arranged for them at the offices of companies which do not send personnel representatives to the campus.

The work of the placement bureau does not cease at commencement time, but continues all year. The combined efforts of the placement bureau, the directors of curricula, and the seniors themselves, result yearly in the placement of practically all graduating seniors who seek employment.

ALUMNI PLACEMENT. The placement bureau acts as a clearing house for the placement of alumni who are seeking employment or better positions. During the course of the year, many alumni find employment through this service.

FINANCIAL AID

SCHOLARSHIPS AVAILABLE TO FRESHMEN

I. Competitive Regional Scholarships

1. Lehigh University offers each year ten competitive scholarships valued at $1, 600 each for four years of college work. These scholarships cover tuition in the College of Arts and Science, the

College of Business Administration, or the College of Engineering. The scholarships once assigned will continue in force for the full four years of the student's residence at Lehigh University, unless he shall fail to meet the scholastic average of 2.50 or better and the qualifications of a good citizen. These scholarships are given strictly on merit and irrespective of the need for financial aid.

2. In order to compete for one of these scholarships, a freshman candidate must take the following steps:

(a) Write a letter to the office of admissions, Lehigh University, Bethlehem, Pennsylvania, indicating his intention to compete, and requesting a form on which to submit his application. The application should be received by the office of admissions before March 1 of the calendar year in which the applicant expects to enter Lehigh University.

(b) Submit a satisfactory record of his secondary school preparation, which must meet all entrance requirements for the particular college he wishes to enter. A preliminary record must be submitted on forms which will be provided, as soon as possible after the close of the first semester of the senior or final year of secondary school preparation.

(c) Submit on the form provided a complete record of his secondary school extracurricular activities, to which should be added information regarding any important piece of creative work, independent study, or other notable accomplishments which do not appear in his regular record submitted for admission. His guidance officer must attest the accuracy of this record.

(d) Ask his principal or headmaster to send to the office of admissions, Lehigh University, a general character recommendation and a general estimate of his fitness to do college work.

(e) Compete in certain examinations offered under the auspices of the College Entrance Examination Board, namely, a Scholastic Aptitude Test and a Scholastic Achievement Test. (In 1943 these tests will be given on Saturday, April 10.)

Awards will be made in the order of the contestants' ratings on such weighted factors as preparatory school scholastic record, evidences of effective leadership and distinguished group service,

character and personality, and performance in the competitive examinations, the last factor being the most heavily weighted. Awards will be assigned geographically, two each to the New England States and the Middle Atlantic States, three to the Southeastern States, and three at large. However, if in any year the winning candidate or candidates in some area do not show a total weighted rating reasonably commensurate with the ratings of runners-up in other geographical divisions, one or more of the awards to that area may lapse for that year and be assigned to superior candidates from other geographical divisions.

Further details regarding the taking of the examinations and the records to be submitted will be forwarded to applicants upon request.

Address all communications to the office of admissions, Lehigh University, Bethlehem, Pennsylvania.

II. Scranton Public High Schools Scholarships

Four scholarships,provided through the gifts of friends of Lehigh University, are to be awarded, one each year, to graduates of the public senior high schools of Scranton, Pennsylvania, of which there are now two, viz., Central High School and Technical High School. The scholarship is to cover the tuition fee of the holder thereof.

In the event that there should be no satisfactory applicants from any of the public senior high schools of Scranton in any given year, the scholarship for that year may be awarded to any satisfactory applicant residing in Scranton.

A scholarship award is to be renewed yearly to the initial holder thereof until he graduates, provided he remains in school and maintains a grade at least equal to the average of his class during the preceding year.

The following qualifications only are to be the basis of the award of the scholarships: (a) a good character; (b) need of pecuniary assistance; (c) high scholastic ability. The awarding of these scholarships will be administered through the committee on scholarships and loans.

At the discretion of the President, each scholarship may be divided into two or more partial scholarships totaling one full scholarship, so that two or more may benefit by any annual award.

If at any time the income from the funds should warrant, two scholarships may be awarded in one year. If at any time the accumulated income is not sufficient to pay the full amount of the tuition fee, the scholarship shall be awarded nevertheless, the balance being taken from the principal of the fund.

III. General Undergraduate Scholarships

Freshmen are also eligible for free scholarships and deferred payment scholarship loans as described in the following section. Regular interest-bearing loans, as described below, are not available to freshmen or other students matriculating at the University for the first time.

GENERAL UNDERGRADUATE SCHOLARSHIPS AND LOANS

By authority of the board of trustees, a limited number of *free* scholarships are awarded annually to undergraduate students. The usual award amounts to $200 and is applicable against tuition payments only, giving full and final remission of one-half of each semester's tuition charge. In exceptional cases an award may be made in the amount of $400 to meet the full tuition charge.

Deferred payment scholarship loans are also available, either to supplement a free-half-tuition award when the applicant's scholarship rating is sufficiently high and when the economic situation of the applicant's family clearly warrants it; or given independently of any scholarship award as may be determined by the committee on scholarships and loans. For this loan the student signs a note, endorsed by his parents or guardian, binding him to repay the amount of the loan, such payment to begin at the latest within three months after graduation or withdrawal from the University, in instalments of $15 per month the first year and $20 a month thereafter until the debt is liquidated.

The basis of award for both *free scholarships* and *deferred payment scholarship loans* is: (a) financial need; (b) character and personality; (c) high scholastic achievement as evidenced by rank in school class and by performance in the April Scholarship Examinations of the College Entrance Examination Board; (d) leadership qualities and participation in school activities other than scholastic.

(a) The committee on scholarships and loans must be thoroughly convinced that the student is unable to pay his tuition in full or part and that, with the tuition aid granted, the student will be fully able to finance himself for the year with no serious difficulty. The burden of positive proof on these points is placed on the student. An inquiry form regarding financial status is a part of the application-for-aid form.

(b) Evidence must be presented of excellence of character and personality.

(c) The *minimum* scholastic requirement is, in the case of a freshman, rank in the top third of his graduating class in high school or preparatory school, and in the case of a university sophomore, junior, or senior, an average grade during the previous academic year of 2.00 or better. (Average grades are computed by weighting A as 4, B as 3, C as 2, D as 1, and F as 0.) College Board scores are comparative; there is no minimum score required of candidates.

(d) Other factors being equal, preferential consideration may be given to the student who, in addition to making a meritorious scholastic record, has also been able to demonstrate successful leadership in one or more non-scholastic activities in school or on campus.

A student transferring from another four-year college, unless he has been graduated, is not eligible to apply for a scholarship or deferred payment scholarship loan until he has completed one year at Lehigh University.

A student entering from a recognized junior college with full transferred credits (junior year standing) may be a candidate for a free scholarship or a deferred payment scholarship loan, or both, on his junior college record.

Any scholarship or loan award is for one year only; but a student holding a scholarship or loan in any year may apply on his record for further award for the following year. Ordinarily his award will be continued unless his scholastic average is below 2.00.

A freshman who barely meets the minimum scholastic standard specified above is qualified to enter competition for financial aid; but funds available are awarded on a competitive basis, and a candidate who does not rank well up in the top fifth of his

graduating class, or who has not achieved some distinction in non-academic activity, cannot hope for success in the competition.

In addition to awarding the scholarships and scholarship loans described above, the University makes interest-bearing loans from its endowed loan funds. Except for small amounts in unusual emergencies, such loans are made only to apply toward tuition, in cases of demonstrated need, satisfactory character and personality, and a scholastic record which is considered satisfactory although falling below the standard required for a scholarship award. Loans, other than the deferred payment scholarship loans referred to above, *are not available to new students*—freshmen or transfer students with advanced credit.

The maximum loan, in any one academic year, to a student with an average below 2.00 but 1.50 or over is $300, and the maximum loan to a student with an average below 1.50 is $200. These are loans only for students who have been in the University one or more years.

No loan can be made to a student whose average is below 1.00, or who is on scholastic disciplinary probation, or who has been in residence less than one year.

The maximum indebtedness to the University which a student may normally be permitted to incur is $800, i.e., the equivalent of deferred payment scholarship loans of $200 each year for four academic years. The absolute maximum in exceptional cases is $1,000.

Time Limit for Repayment. Every student incurring indebtedness to the University is required to undertake to pay his debt in full within five years after his graduation or withdrawal according to a schedule to be agreed upon. In case of the normal maximum debt of $800 the payment should be completed within four years, as follows:

First year—12 monthly payments of $15	$180
Second year—12 monthly payments of $20	240
Third year—12 monthly payments of $20	240
Fourth year—7 monthly payments of $20	140
	$800

Interest on Deferred Payment Scholarship Loans. Indebtedness incurred through deferred payment scholarship loans bears

no interest so long as the student is in residence. From the date of graduation or withdrawal such indebtedness bears interest at the rate of 2% for the first year, 3% for the second year, 4% the third, 5% the fourth year, and 6% thereafter.

Interest on Loans. Loans from the loan funds bear interest at 6% from the date of the loan.

Acceptance and Deposit. All students to whom scholarships or loans of any kind are awarded are required to signify within ten days their acceptance of such award and their intention to register in Lehigh University at the next registration period, and to accompany this notice of acceptance and intention with a check or money order for $25; this amount to be applied at registration against incidental and laboratory fees, but to be non-returnable in case of non-registration.

Application. Candidates for scholarships or loans must make application on forms provided by the committee on scholarships and loans. Candidates not previously enrolled in the University should write for the form to the director of admissions; candidates who have been enrolled in the University one semester or longer should write to the dean of undergraduates. Dates for filing applications are:

1. Before March 1 for freshman and transfer students from other colleges.

2. Before May 15 for sophomores, juniors, or seniors who have been on the campus for one or more years. Applications for free tuition scholarships and deferred payment scholarship loans *must* be *received before May 15,* but it is to a candidate's advantage to send in his application for these by May 1. All requests must be based on a budget for at least a *full academic year* (two semesters). If a student is on the accelerated program he should include any request for aid during the summer semester with request for fall and spring semester aid, if such is also needed.

Any application for scholarship aid not conforming to the above procedure can be given consideration only if received one full month in advance of the date of registration for the semester concerned.

SCHOLARSHIPS FOR UNDERGRADUATES PREVIOUSLY ENROLLED

The Ray Sands Nostrand Scholarship

The Ray Sands Nostrand Scholarship was established by the late Benjamin Nostrand, Jr., M.E. ,78, in memory of his son, Ray Sands Nostrand, '17. The income from this fund is awarded to students of the University. The requirements governing the award of university scholarships apply likewise to this scholarship.

The Fred. Mercur Memorial Fund Scholarship

Friends of the late Frederick Mercur, of Wilkes-Barre, Pa., General Manager of the Lehigh Valley Coal Company, desiring to establish a memorial of their friendship and esteem, and to perpetuate his memory, contributed and placed in the hands of the trustees of the University a fund called the Fred. Mercur Memorial Fund. The income from this fund is awarded to students of the University. The requirements governing the award of university scholarships apply likewise to this scholarship.

The Henry S. Haines Memorial Scholarship

Mrs. Henry S. Haines, of Savannah, Ga., established in 1889 a scholarship of the annual value of $100.00 as a memorial to her son, Henry Stevens Haines, M.E. '87. By the terms of the bequest this scholarship is awarded to a student in the curriculum in mechanical engineering. The requirements governing the award of university scholarships apply likewise to this scholarship.

The William S. Cortright Scholarship

Mrs. William S. Cortright established in 1938 a fund, the income from which provides a scholarship annually in memory of her husband who graduated from Lehigh University in 1872. By the terms of the bequest this money is to be used for the maintenance of a part tuition scholarship to be awarded to a student who is a resident of Bethlehem or the immediate vicinity and who is enrolled in the curriculum of mechanical engineering. The award is to be made by the committee on scholarships and loans under the regular requirements governing the award of other university scholarships.

The Natt Morrill Emery Scholarship

Established in memory of the late Natt Morrill Emery, vice-president and controller of Lehigh University, by an alumnus and former student of Dr. Emery's, the Natt Morrill Emery Scholarship covers the full tuition fee. It will be awarded by Lehigh University every four years (or whenever it becomes vacant) from 1940 to 1956 inclusive to that graduate of the high schools of Richmond, Virginia, selected by the Richmond school authorities, who during his scholastic career has exemplified in character and conduct the qualities of loyalty and ability which marked the services of Dr. Emery to Lehigh University.

The Murtha P. Quinn Scholarship

Mr. Murtha P. Quinn left one-thirtieth of his residual estate to Lehigh University for the purpose of establishing a free tuition scholarship in the amount of $400.00 annually. Preferance is to be given to students whose homes are in South Bethlehem.

LOAN FUNDS

The Eckley B. Coxe Memorial Fund

In memory of the late Eckley B. Coxe, trustee of the University, Mrs. Coxe established a fund, amounting to $70,000.00, the interest of which is used, under the direction of the trustees of the University, and subject to such regulations as they may adopt, for the assistance of worthy students requiring financial aid.

The Frank Williams Fund

Frank Williams, B.S. '87, E.M. '88, who died in October, 1900, bequeathed to the University the greater part of his estate to found a fund, now amounting to $206,000.00, the income of which is lent to deserving students.

The Frazier and Ringer Memorial Fund

The Frazier and Ringer Memorial Fund was established in 1906 by the late Robert H. Sayre, in memory of Benjamin West Frazier, A.M., Sc.D., former professor of mineralogy and metallurgy, and Severin Ringer, U.J.D., former professor of modern languages and literature and of history, each of whom served Lehigh University for one-third of a century. The income of this fund and payments made by former borrowers are available for loans to cover the medical and surgical care of worthy students.

The President's Fund

The President's Fund was established during the early years of the University for the help of deserving students. As payments are made by former beneficiaries, they are immediately available for the assistance of students of the University.

GRADUATE SCHOLARSHIPS

University Scholarships

The board of trustees has authorized the annual award, to graduate students, of twelve full free scholarships, on the basis of superior qualifications, and twelve deferred payment scholarship loans, on the basis of qualification and need. In general these scholarships are administered under regulations similar to those given above under the heading "General Undergraduate Scholarships and Loans." Inquiries should be addressed to the dean of the Graduate School.

The William C. Gotshall Scholarships

Nine scholarships were provided by a bequest from the late William C. Gotshall for worthy graduate students in any branch or course of engineering offered at Lehigh University. Appointment is for one year with an annual stipend of $500 with exemption from the university tuition fee. No duties other than graduate study are required of the holders.

ENDOWMENT OF SCHOLARSHIPS

Undergraduate or graduate scholarships named to honor an individual or corporation may be established in perpetuity through the payment to the board of trustees of Lehigh University of $10,000.00. The income from this donation will be paid to the holder of the scholarship to be applied toward the payment of university fees. The University does not, however, guarantee that this income will be forever sufficient to pay such fees in full.

PRIZES

Owing to the decreased return on invested funds, the income available for payment of prize awards may be insufficient to pay the amounts originaly designated and planned by the donor. The University reserves the right to make such adjustments as may be necessary.

The Wilbur Scholarship

The Wilbur Scholarship, founded in 1872 by the late E. P. Wilbur, provides the sum of $200.00 which is awarded annually to the sophomore with the best record for the sophomore year.

The John R. Wagner Award

The John R. Wagner Award was established by the widow of John R. Wagner, Lehigh, 1885, in memory of her husband. The sum of $15 is awarded on Founder's Day each year to the junior student in mechanical engineering whose scholastic record is the highest in his class in the freshman and sophomore years and whose character and life purposes are deemed deserving and worthy.

The Wilbur Prizes

A fund was established by the late E. P. Wilbur for distribution in prizes as the faculty may determine. This fund yields an annual income of $100, which is used at present to provide awards as follows:

Wilbur Prizes, Freshman Year—a first prize of $15 and a second prize of $10 to the highest ranking and second highest ranking freshman in mathematics; prizes of $15 each to the highest ranking freshman in English, German, and French.

Wilbur Prizes, Sophomore Year—prizes of $10 to the highest ranking sophomores in mathematics, English and physics.

The John B. Carson Prize

An annual prize of $50.00 was established by Mrs. Helen Carson Turner, of Philadelphia, Pa., in memory of her father, John B. Carson, whose son, James D. Carson, was a graduate of the civil engineering curriculum of Lehigh University in 1876. It is awarded to that senior in civil engineering who shows the most marked excellence in the professional courses of his curriculum.

The William H. Chandler Prizes in Chemistry

Four annual prizes of $25.00 each, one in each class, for excellence in the curricula in chemistry and chemical engineering, were established by Mrs. Mary E. Chandler, of Bethlehem, Pa., widow of Dr. William H. Chandler, who was professor of chemistry at Lehigh University from 1871 until his death in 1906. In memory of Dr. Chandler the faculty named the prizes the William H. Chandler Prizes in Chemistry.

The Electrical Engineering Prize

An annual prize of $15.00, established by an anonymous graduate of the curriculum in electrical engineering, is awarded to the member of the sophomore class in electrical engineering having made the best record in the work of the sophomore year.

The Philip Francis duPont Memorial Prize in Electrical Engineering

The Philip F. duPont Memorial Prize Fund was established in 1929 by L. S. Horner, E.E. '98. The annual income of this fund is awarded each year in the way of prizes, two-thirds to the highest ranking senior and one-third to the second highest ranking senior in electrical engineering, the course from which Mr. Horner was graduated.

The Horn Prize

The heirs of Harold J. Horn, E.E. '98, established a fund, the income of which is used in the award of two prizes of $10.00 and $5.00 for the best work in senior Electrical Engineering Proseminar.

Alumni Prizes

Funds are provided by the alumni association for the annual award of four prizes of $25.00 each. Two prizes are awarded to the highest ranking juniors in the College of Engineering, one to the highest ranking junior in the College of Arts and Science, and one to the highest ranking junior in the College of Business Administration.

The Williams Prizes in English

The late Professor Edward H. Williams, Jr., an alumnus of the University of the class of 1875, established prizes for excellence in English composition and public speaking. The freshman, sophomore, and junior prizes are awarded by the faculty on the recommendation of the department of English.

Sophomore Composition Prizes. A first prize of $50.00, a second prize of $25.00, and a third prize of $15.00 are awarded annually for the three best compositions submitted by sophomores of regular standing as required work in their English courses.

Junior Composition Prizes. A first prize of $50.00, a second prize of $25.00, and a third prize of $15.00 are awarded for the three best essays submitted by juniors as part of the required work in their courses in English.

The Williams Senior Prizes

The Williams Senior Prizes are awarded by the faculty on the recommendation of the committee on Williams Senior Prizes.

1. First prizes of $75.00 and second prizes of $25.00 are awarded annually in each of the five fields of economics, English, philosophy, psychology, and history and government for dissertations submitted by regular members of the senior class on or before May 1.

2. The committee on Williams Senior Prizes publishes, before the close of the university year, a list of recommended subjects for dissertations, but a senior may submit a dissertation upon any other subject in the respective fields if the subject has received the approval of the committee.

3. Each senior entering the competition shall submit to the committee his choice of subject and plan of work by December 1.

4. The awards are made by the faculty upon recommendation of the committee, but no award is made if in any case a dissertation does not meet the standards of merit established by the committee. This standard includes such points as excellence in thought, plan, development, argument, and composition.

The Williams Prizes in Intramural Debating

Sums totalling $200 are awarded annually as prizes in intramural debating. Students engaged in this activity are organized under the direction of the department of English into teams, which compete as units in a series of debates held throughout the year. The sum of $120 is divided equally between the two members of the winning team, the sum of $80 between the two members of the runner-up. Winners of first prizes may not compete in the next succeeding year.

The Williams Prizes in Extempore Speaking

A first prize of $50.00 and a second prize of $25.00 are awarded to freshmen of regular standing who excel in a contest in extempore speaking held in May of each year.

A first prize of $75.00, a second prize of $50.00, and a third prize of $25.00 are awarded annually to the winners in a contest in extempore speaking for juniors and seniors. Winners of first prizes are not eligible to compete in subsequent years.

The Robert W. Blake Memorial Prizes

The Robert W. Blake Memorial Prizes are awarded at the Founder's Day exercises to freshmen enrolled in the program for general education. The prize committee (for the advisory council for general education) is composed of Professors Palmer, Diamond, and Hughes. The income from the Robert W. Blake Memorial Fund is devoted to the purchase of books awarded as prizes on conditions prescribed by the advisory council for general education.

Scholarship Cups

PHI ETA SIGMA CUP. The Phi Eta Sigma honorary freshman fraternity awards annually a scholarship cup to the living group whose freshmen (not fewer than five) have made the highest scholastic average for the year.

INTERDORMITORY SCHOLARSHIP CUP. The interdormitory council has provided a scholarship cup which is awarded for one year to the dormitory section having the highest scholarship average for the preceding year.

PHI SIGMA KAPPA SCHOLARSHIP CUP. The Phi Sigma Kappa social fraternity has provided a scholarship cup which is awarded for one year to the fraternity in the interfraternity council having the highest scholarship average for the preceding year. The cup becomes the permanent property of the fraternity winning it for three successive years.

TRUSTEES' SCHOLARSHIP CUP. The trustees of the University have provided a scholarship cup which is awarded for one year to the living group having the highest scholarship average for the preceding year. The trustees' scholarship cup becomes the permanent property of any living group winning it for three successive years.

Prizes Awarded by Student Organizations

TAU BETA PI PRIZE. The Tau Beta Pi honorary engineering fraternity awards a slide rule each year to the technical freshman having the highest scholastic average.

ETA SIGMA PHI PRIZE. The Eta Sigma Phi classical fraternity awards a cash prize of $10.00 to that student doing the best work in sophomore collegiate Latin.

Pi Tau Sigma Prizes. The Pi Tau Sigma honorary fraternity in mechanical and industrial engineering awards each year a mechanical engineers' handbook to the highest ranking freshman in the curricula in mechanical engineering and industrial engineering respectively.

Eta Kappa Nu Prize. The Eta Kappa Nu honorary fraternity in electrical engineering awards a handbook in electrical engineering to the highest ranking freshman in the curriculum in electrical engineering.

American Society of Civil Engineers Junior Membership Prize. The Lehigh Valley Section of the American Society of Civil Engineers offers a prize of a junior membership in the American Society of Civil Engineers to the highest ranking senior in civil engineering holding membership in the student chapter.

American Society of Mechanical Engineers Junior Membership Prize. The Anthracite-Lehigh Valley Section of the American Society of Mechanical Engineers awards annually a prize of the value of $10.00 to an outstanding member of the Lehigh Student Branch of the A. S. M. E. This prize takes the form of junior membership for one year in the parent society.

American Institute of Electrical Engineers Student Membership Prize. The Lehigh Valley Section of the American Institute of Electrical Engineers awards annually to a member of the graduating class in electrical engineering, who has given outstanding service to the Student Branch of the AIEE, a prize consisting of a one year student membership in the AIEE.

American Chemical Society Award. The Lehigh Valley Section of the American Chemical Society awards a membership in the American Chemical Society and a subscription to a journal of this society to the highest ranking senior in chemistry or chemical engineering.

American Institute of Chemists Medal. The American Institute of Chemists has established annual student medal awards to senior students majoring in chemistry in designated institutions. Each award carries with it a junior membership in the American Institute of Chemists.

HONORS

Honors are of three kinds: graduation honors, class honors, and special graduation honors.

Graduation Honors

Degrees "with honors" are awarded by vote of the faculty to those students who have attained an average of not less than 3.00 in their last two years' work at the University.

Degrees "with high honors" are awarded by vote of the faculty to those students who have attained an average of not less than 3.50 in their last two years' work at the University.

Degrees "with highest honors" are awarded by vote of the faculty to those students who have attained 3.75 in their last two years' work at the University.

Candidates for graduation who have been in residence at the University for less than two years are not eligible for graduation honors.

Graduation honors are announced at the graduation exercises.

In computing the averages of candidates for graduation honors, semester grades are weighted according to the number of credit hours in the course concerned on the basis: A equals 4, B equals 3, C equals 2, D equalls 1, and F equals 0.

Class Honors

At the close of each year, on recommendation of the registrar and by vote of the faculty, class honors are awarded to those members of the freshman and sophomore classes who have made an average of 3.00 or better during the preceding year. The names of these students are announced on Founder's Day and published in the University Register. Notice is also sent to the parent or guardian and to the principal of the high school or preparatory school of which the student is a graduate.

Special Honors

Special honors are awarded at the end of the senior year, on recommendation of the head of the department concerned and by vote of the faculty, to students who have done advanced work of unusual merit in some chosen field. Candidates for special honors must indicate to the head of the department concerned and to the Registrar during the junior year their intention to

work for such honors. Awards are based on grades obtained in the subject chosen, the results in extra work assigned, and the general proficiency of the candidate as evidenced either by a final examination or a thesis, as the head of the department involved may direct. Special honors are announced at the graduation exercises.

ORGANIZATIONS

Honorary Scholarship Societies

PHI BETA KAPPA. Students in the College of Arts and Science and the College of Business Administration who up to the middle of the senior year maintain high scholarship may be elected to membership; also a limited number of engineering students whose work in philosophical, scientific, and language studies is of high grade.

TAU BETA PI. This national honorary society, which now has seventy-one chapters, was founded at Lehigh University in 1885 by Professor E. H. Williams, Jr. Students in the College of Engineering may be elected to membership during their junior and senior years if they have maintained high scholarship.

SIGMA XI. Election to membership is based upon the completion of original and noteworthy research in pure or applied science and the publication of the results thereof. Ordinarily undergraduates are eligible to associate membership only, their election being based upon their promise of achievements in scientific research.

Other Honorary Scholarship Societies

ALPHA EPSILON DELTA (pre-medical)
ETA KAPPA NU (electrical engineering)
ETA SIGMA PHI (classics)
PHI ALPHA THETA (history)
PHI ETA SIGMA (freshman)
PI MU EPSILON (mathematics)
PI TAU SIGMA (mechanical engineering)
ROBERT W. BLAKE SOCIETY (philosophy)

Course Societies

Intellectual interest in various fields of study and professional spirit among pre-medical, business, and engineering students is

promoted by a group of organizations commonly called course societies. The first of these organizations historically was the Chemical Society, established in 1871. The list now includes:

In Arts and Science

Delta Omicron Theta (public speaking)
Ernest W. Brown Astronomical Society
International Relations Club (history and government)
Newtonian Society (mathematics)
Robert W. Hall Pre-Medical Society

In Business Administration

Alpha Kappa Psi (professional fraternity in business administration)
Lambda Mu Sigma (marketing)

In Engineering

Chemical Society
Student Chapter of the American Society of Civil Engineers
Electrical Engineering Society (student branch of the American Institute of Electrical Engineers)
Fritz Engineering Research Society
Industrial Engineering Society
Mechanical Engineering Society (student branch of the American Society of Mechanical Engineers)
Metallurgical Society
Mining and Geological Society (student branch of the American Institute of Mining and Metallurgical Engineers)
Physics Club
Radio Club

Other Organizations

Other student organizations include:
Alpha Lambda Omega
Alpha Phi Omega (national service scouting fraternity)
Alpha Town House (independent living group)
Arcadia (student self-government council)
Army Ordnance Association (Lehigh Post)
Brown Key Society (letter men)
Canterbury Club (religious)

Chess Club
Combined Musical Clubs
Cosmopolitan Club
Cut and Thrust Society (fencing)
Cyanide Club (junior honorary society)
Lehigh Collegians (dance orchestra)
DeMolay Club
Glee Club
Golf Club
Ice Hockey Club
Interdormitory Council
Interfraternity Council
Lacrosse Club
Lehigh Camera Club
Lehigh University Band
Lehigh Keystone Society
Mustard and Cheese (dramatic club)
Omicron Delta Kappa (senior honorary fraternity)
Pi Delta Epsilon (honorary journalistic fraternity)
Rifle Club
Scabbard and Blade (honorary military fraternity)
Shop Club (hobbies)
Ski Club
Spiked Shoe (honorary fraternity, track athletics)
Sportsmen's Club
Student Concerts-Lectures Committee
Symphony Orchestra
Tone (music)
Town Council (off-campus living groups)
Yacht Club

The following Greek letter fraternities have chapters at Lehigh University: Alpha Chi Rho, Alpha Kappa Pi, Alpha Tau Omega, Beta Theta Pi, Chi Phi, Chi Psi, Delta Phi, Delta Sigma Phi, Delta Tau Delta, Delta Upsilon, Kappa Alpha, Kappa Sigma, Lambda Chi Alpha, Phi Delta Theta, Phi Gamma Delta, Phi Sigma Kappa, Pi Kappa Alpha, Pi Lambda Phi, Psi Upsilon, Sigma Alpha Mu, Sigma Chi, Sigma Nu, Sigma Phi, Sigma Phi Epsilon, Tau Delta Phi, Theta Chi, Theta Delta Chi, Theta Kappa Phi, Theta Xi.

Student Publications

The students of Lehigh University publish a semi-weekly college newspaper, *The Lehigh Brown and White;* a monthly magazine, *The Lehigh Bachelor;* a year book, *The Epitome;* an annual *Freshman Handbook;* and an annual *Directory of The Interfraternity Council.*

ALUMNI ASSOCIATION

The Alumni Association, which has been in existence since 1876, was incorporated in 1917 under the name the Alumni Association of the Lehigh University, Inc. The offices of the association are in the Alumni Memorial Building. Along with the regular alumni activities, the association is largely concerned with raising money to meet the needs of the University.

The officers of the Alumni Association for 1943-44 are:

President, Nevin E. Funk, '05, of Philadelphia, Pa.

Vice-President, Robert C. Watson, '13, of Washington, D. C.

Vice-President, Geo. F. Nordenholt, '14, of New York, N. Y.

Treasurer, Robert S. Taylor, '95, of Bethlehem, Pa.

Executive Secretary, Robert F. Herrick, '34, of Bethlehem, Pa.

Assistant Secretary and Editor of *Lehigh Alumni Bulletin,* Leonard H. Schick, '37, of Bethlehem, Pa.

Archivist, Arthur W. Klein, '99, of Bethlehem, Pa.

The following are the alumni clubs: New York Lehigh Club, Philadelphia Lehigh Club, Pittsburgh Lehigh Club, Chicago Lehigh Club, Washington, D. C. Lehigh Club, Detroit Lehigh Club, Cincinnati Lehigh Club, Northeastern Pennsylvania Lehigh Club (Scranton and Wilkes-Barre, Pa.), Maryland Lehigh Club (Baltimore, Md.), Youngstown (O.) Lehigh Club, Lehigh Club of New England (Boston, Mass.), Lehigh Club of Central Pennsylvania (Harrisburg, Pa.), Lehigh Club of Northern New York (Schenectady, N. Y.), Lehigh Club of Central New York (Rome, N. Y.), Lehigh Club of Northern Ohio (Cleveland, O.), Lehigh Club of Southern New England (Hartford, Conn.), Lehigh Club of Western New York (Buffalo, N. Y.), Lehigh Home Club (Bethlehem, Pa.), Lehigh Club of China (Shanghai, China), Lehigh Club of Southeastern Pennsylvania (Reading, Pa.), Le-

high Club of Central Jersey (Trenton, N. J.), Lehigh Club of York (Pa.), Lehigh Club of Northern New Jersey (Newark), Lehigh Club of Northern California (San Francisco), Lehigh Club of Southern California (Los Angeles), Lehigh Club of Delaware (Wilmington), Lehigh Club of Monmouth County, N. J.

BUILDINGS AND GROUNDS

The University occupies twenty-three buildings and grounds covering one hundred eighty acres on the north side of South Mountain, overlooking the valley of the Lehigh River and the city of Bethlehem. In addition, the University has an athletic field of ten acres in area with field house, gymnasium, and covered grandstand, located about a mile from the university campus.

Packer Hall

Packer Hall is a four-story sandstone building, 215 feet long and 60 feet wide.

The department of civil engineering occupies the greater part of the first and second floors. The instrument rooms contain transits, levels, a large geodetic theodolite, plane tables, and other instruments for engineering field work. In the department headquarters is a collection of plans of engineering structures.

The departments of mathematics and astronomy, philosophy, education, and psychology are located in this building. The psychology laboratory has the standard equipment for the several courses in experimental psychology and for research.

The William H. Chandler Chemistry Laboratory

The Chemistry Laboratory is a three-story fire-proof sandstone building, 259 feet long and 44 feet wide, with a wing 62 feet long and 42 feet wide, and with a three-story extension 60 feet long and 37 feet wide. An additional three-story wing 116 feet long by 52 feet wide has been added to the east of the original building.

Laboratory space and equipment are provided for qualitative and quantitative analysis, inorganic chemistry, organic chemistry, sanitary chemistry, industrial biochemistry, colloid chemistry, X-ray analysis, gas analysis, the furnace assay of ores, industrial chemistry, chemical engineering, and research in chemistry and

chemical engineering. A chemistry museum is located in this building.

The trustees of the University named this building, exclusive of the new east wing, the William H. Chandler Chemistry Laboratory in recognition of Dr. Chandler's thirty-five years' service as professor of chemistry, 1871-1906. The trustees have named the east wing the Harry M. Ullmann Chemistry Laboratory, in recognition of his service as head of the chemistry department.

The Physics Laboratory

The Physics Laboratory is a four-story sandstone building, 240 feet long and 44 to 56 feet wide. This building is devoted entirely to the department of physics. Apparatus and other facilities are provided for lecture and laboratory inspection and research. In addition to offices, recitation rooms, and lecture rooms there are several large laboratory rooms, a reading room, machine shop, wood working shop, glass-blowing room, constant-temperature rooms, storage battery room, sound-proof rooms, dark rooms, and several research laboratories. The building is equipped throughout with water, gas, compressed air, and electric power outlets.

The W. A. Wilbur Engineering Laboratory and Power House

The W. A. Wilbur Engineering Laboratory and Power House is a two-story sandstone building, 188 feet long and 44 feet wide.

The power plant contains four Babcock and Wilcox straight-tube cross-drum boilers, each rated at 300 boiler horse power, four Coxe chain grate stokers, two turbine driven Sturtevant blowers, and coal, water, and ash handling equipment of modern design. The plant is designed and equipped to provide steam at 250 lbs. pressure to the engineering laboratories, in addition to heating the university buildings. It is so arranged that any boiler can be isolated for laboratory tests for long periods if necessary. From this plant a six-inch line carries steam to the Packard Laboratory at the pressure desired for the laboratory work. Modern safety appliances and measuring equipment have been incorporated.

A coal-storage yard has room for two months supply of coal, and a system of belt conveyors and bucket-elevators is provided for receiving coal, dumping it on storage pile, and conveying it into the boiler room as needed.

Williams Hall

Williams Hall, the donation of Dr. Edward H. Williams, Jr., of the class of 1875, was so named by the trustees of the University in recognition not only of this gift but also of Dr. Williams' long continued and important service to the University as professor of mining and geology.

Williams Hall is a three-story brick building, 186 feet long and 70 feet wide. It contains the offices, class rooms, laboratories, departmental libraries, and museum collections of the departments of metallurgical engineering, geology, and biology.

The Fritz Engineering Laboratory

The late John Fritz, of Bethlehem, known as the father of the steel industry in the United States, a member of the original board of trustees of the University, gave to the University funds for the erection and thorough equipment of an engineering laboratory. The building was designed and erected under the personal supervision of Mr. Fritz. The building is equipped with a general testing section for testing iron and steel, a cement and concrete section, and a hydraulic section. The equipment is used by the civil engineering department in connection with its research projects and for instruction in mechanics of materials, hydraulics, and cement and concrete.

The Fritz Engineering Laboratory is of brick and steel frame construction, 115 feet long and 94 feet wide, with the main central section 65 feet in height, and two side sections of lesser height. An electrically-operated traveling crane, of 10-ton capacity, commands the entire central portion of the building in which the testing of large specimens is carried on.

The general testing section is equipped with an 800,000 pound Riehlé vertical screw testing machine, capable of testing columns 25 feet long or less, tensile specimens 20 feet long or less, and transverse specimens up to lengths of 30 feet; an Olsen universal testing machine of 300,000 pounds capacity; smaller machines for ordinary tension, compression, transverse, and torsion tests; a cold-bend testing machine, impact and fatigue machines, and a small machine shop. The hydraulics section is equipped with various tanks, weirs, pumps, and other apparatus for studying problems in hydraulics. The cement and concrete section has a large room for the making and testing of specimens and a room for the storage of materials.

The Eckley B. Coxe Mining Laboratory

The Eckley B. Coxe Mining Laboratory is a two-story sandstone building, 100 feet long and 75 feet wide. It is occupied exclusively by the department of mining engineering.

The building contains the office of the department of mining engineering, the main lecture room, a locker and wash room, a laboratory equipped for fuel research, a balance room, and shop.

On the lower main floor are two air compressors, rock drills, and a motor-generator set. The upper main floor has one section for crushing, grinding, and the preparation of samples, and for making sieving tests. The remainder of this floor is equipped with units for elementary and advanced laboratory work in ore dressing and coal preparation—ball mills, a rod mill, classifiers, jigs, concentrating tables, flotation machines, magnetic separators, and a Chance coal cleaner, together with auxiliary equipment such as float-and-sink apparatus, ore-dressing microscope, etc.

The lower second floor is equipped as a laboratory for the necessary analytical work in connection with ore dressing and coal preparation, and as a fuel technology laboratory for coal, gas and oil analysis. Part of the upper second floor is used as a departmental drafting room in connection with the courses in mine surveying and mining methods; the remaining portion is being equipped as a mine ventilation laboratory.

The laboratory was named by the trustees of the University in memory of Eckley B. Coxe, who was a pioneer and a leader in the profession of mining engineering in this country, and an active friend and valued trustee of the University from its early days until his death.

Christmas-Saucon Hall

Christmas-Saucon Hall is a three-story stucco building. It contains the office of the College of Business Administration, the offices, lecture rooms, and recitation rooms of the departments of English, accounting, economics and sociology, and finance, the offices and dispensary of the students' health service. Christmas Hall has historic interest as the first building of Lehigh University.

Coppée Hall

Coppée Hall is the headquarters of the College of Arts and Science. It contains the offices of the College of Arts and Science,

a lecture room, and the offices and recitation rooms of the departments of German, Latin, Greek, romance languages, history and government, and fine arts.

Sayre Observatory

The Sayre Observatory was the gift of the late Robert H. Sayre, one of the original trustees of the University.

The observatory contains an equatorial telescope of six inches clear aperture and of eight feet focus, by Elvin Clark; a zenith telescope of four and one half inches clear aperture; an astronomical clock, by William Bond & Son; a meridian circle; a prismatic sextant, by Pistor and Martins; an engineer's transit and a sextant by Buff and Buff. Students in practical astronomy receive instruction in the use of the instruments and in observation.

The land upon which the observatory stands, consisting of seven acres adjoining the original grant, was presented to the University by the late Charles Brodhead, of Bethlehem.

The Packer Memorial Church

The Packer Memorial Church, in which chapel services are held, was the gift of the late Mrs. Mary Packer Cummings, daughter of the founder of the University. It was built in 1887. Occasionally musical recitals and the annual Bach Festival are held in this building and it houses the scores, records, and phonograph of the College Music Set, the gift of the Carnegie Foundation.

The University Library

The original library building was erected by the founder of the University in 1877 as a memorial to his daughter, Mrs. Lucy Packer Linderman. The present library, constructed on three sides of the original building, is in the collegiate Gothic style of architecture. It contains five times the floor space of the old structure and affords shelving capacity for approximately 500,000 volumes. Space in the reading room and seminars and other special rooms is sufficient for about 500 readers. Adequate space for the cataloguing departments and other purely administrative functions of the library is provided, together with special rooms for the treasure collection and the Lehigh collection. There are eleven seminar rooms for advanced study. The building contains a browsing room and an art gallery. Individual cubicles are available in the stacks for advanced students and research workers.

258,000 volumes are now upon the shelves. The list of current periodicals numbers about nine hundred and eighty. The library is especially rich, for one of its size, in materials for research in history, American newspapers, and the history of early science, and in the files of technical journals. The library is a depository for government documents.

Small working reference collections for laboratory use are maintained by the departments of biology, geology, chemical, civil, mechanical, and mining engineering.

The library is open, except on holidays, from 8 a.m. to 10 p.m.; from 8 a.m. to 5 p.m. on Saturdays.

The use of the library, with privilege of borrowing books, is offered to all members of the University; faculty, students, and alumni. Students are allowed free access to the books and are encouraged to become familiar with methods of using a library for literary and scientific work. The privileges of the library are also extended to all qualified residents of the city. The library offers its service to the industries located in the community.

The Eckley B. Coxe Memorial Collection

In memory of Eckley B. Coxe, for many years a trustee of the University, Mrs. Coxe presented to the University his technical library consisting of 7,727 volumes and 3,429 pamphlets. As the working library of a man who was remarkable for the extent and thoroughness of his acquaintance with the whole field of applied science, this collection possesses great value for students of science and engineering.

The Joseph W. Richards Collection

The Joseph W. Richards Library of Metallurgy and Chemistry, consisting of about 3,000 volumes is located on the second floor of Williams Hall, and is open for use under the supervision of the department of metallurgy.

The Lehigh Art Gallery

Frequent exhibitions are held in the art gallery of paintings, watercolors, drawings, sculpture, photographs, or prints—chiefly by contemporary American and foreign artists. The University owns a small collection of prints and a few paintings, largely gifts of alumni and friends of the University; these are also exhibited from time to time. The Lehigh Art Gallery is a definite

part of the university's educational and cultural program. While intended primarily for the interest of students, the exhibitions are open freely to the public.

Charles Russ Richards House

The Charles Russ Richards House is a new four-story fire-proof dormitory which was completed September, 1938. It has accommodations for 144 students. It contains an adequate recreation room, a spacious lounge, two reception rooms for visiting friends, attractive single rooms, and a limited number of suites. The rates for the suites are $200 a year for each occupant, for single rooms $180 and $190 a year, and for double rooms $140 and $150 a year for each occupant.

Henry Sturgis Drinker House

The Henry Sturgis Drinker House, a new four-story fire-proof dormitory, completed in September, 1940, has accommodations for 126 students. It is equipped with a recreation room, a spacious lounge, a reception room for visitors, very attractive single rooms, and a limited number of double rooms. The rates for the single rooms are $180, $190, and $200 a year, and for the double rooms, $140, $150, and $180 a year for each occupant.

Eugene Gifford Grace Hall

Eugene Gifford Grace Hall, named for the donor and devoted to sports and recreation, is a stone building, approximately 120 feet wide and 180 feet long. It provides a sports theater which also serves as an assembly room for the University with a seating capacity of about 3000. The upper floor consists of an armory drill floor, which is also available for the larger university dances and receptions. The building contains rooms for the band and orchestra, offices, athletic teams, and classrooms for the Reserve Officers' Training Corps. Promenade terraces at the level of the dance floor on three sides of the building afford views over the Lehigh Valley and of South Mountain.

Charles Lewis Taylor House

The Charles Lewis Taylor House, the gift of Mr. Andrew Carnegie, is a three-story concrete dormitory with accommodations for 145 students. There are suites of three rooms (a study and two adjacent bedrooms) for two occupants, and a few single rooms. The building was named Taylor Hall by Mr. Carnegie in honor of Charles L. Taylor, his former partner in business, a

graduate of the University of the class of 1876, and a trustee of the University. The rates for the suites of rooms are $140 and $115 a year for each occupant. The single rooms are $50, $75, $92, $104, and $115 a year.

Henry Reese Price House

The Henry Reese Price House furnishes dormitory accommodations for thirty-eight students. It was named in honor of Dr. Henry R. Price, an alumnus of the University of the class of 1870, late president of the board of trustees. The rates vary from $50 to $135 a year for each occupant.

Drown Memorial Hall

Drown Memorial Hall was erected by friends and alumni as a memorial to the late Thomas Messinger Drown, LL.D., president of the University from 1895 to 1904. The building is devoted to the social interests of the university students. It contains study, reading, and lounging rooms, an assembly hall, the offices of Arcadia (student governing body), and of the college publications, the editorial and business office of the *Brown and White*, student semi-weekly newspaper, and club rooms for the dramatic and musical organizations, and faculty.

Alumni Memorial Building

The Alumni Memorial Building, which is used as the administration building of the University, was erected as a memorial to 1,921 Lehigh men who served in the World War, and especially to the forty-six who gave their lives. The cost of erection was raised by subscription from about 1,700 alumni. The Memorial Hall contains the records of the Lehigh men who served and those who died, together with mementos of the war.

In the south wing of the building are the offices of the president, the dean of undergraduates, the registrar, the director of admissions, the superintendent of buildings and grounds, and the director of placement. The north wing contains the offices of the treasurer, the bursar, the auditor, and the alumni association, the university supply bureau, and a large room used for faculty meetings and the meetings of the alumni association and of the alumni council.

Taylor Gymnasium and Field House

In 1913 Charles L. Taylor, E.M., '76, donated to the University the funds required for the erection of a gymnasium and field house.

Taylor Gymnasium adjoins the athletic field. The building is 222 feet long and 73 feet wide. On the ground floor is located the game room, 93 by 70 feet, used for basketball and wrestling. The game room is surrounded by a gallery for spectators. The main gymnasium floor measures 90 by 70 feet. Other rooms in Taylor Gymnasium are the offices of the director of athletics and physical education, staff offices and measuring room of the department of physical education, basketball and handball courts, fencing, boxing, and wrestling rooms, and locker rooms with accommodations for the entire student body.

The gymnasium is equipped with modern appliances for individual and class work in recreative and corrective exercises, calisthenics, and other gymnastics. Adjoining the locker rooms is a swimming pool, 75 by 25 feet, with a depth from 4½ to 9½ feet, and with a capacity of 95,000 gallons.

Adjoining the gymnasium and the stadium is the Taylor Field House. It is three stories in height, and has dressing rooms, lockers and shower baths for visiting and Lehigh teams. The third floor addition is known as the Samuel E. Berger Room and was built from funds given by Mr. Samuel Erwin Berger, B.A., '89.

Taylor Field

An athletic field of more than nine acres in area is provided for the accommodation of students who participate in the various outdoor sports. The stadium, located on the lower level, provides football and baseball fields, surrounded by concrete stands having a seating capacity of 12,000. On the upper level there is a practice field for football, baseball, lacrosse, and soccer; also a quarter mile track and a 220-yard straight-away. During the winter months a wooden outdoor running track, twelve laps to the mile, is provided.

Lehigh Field and Field House

An additional athletic field of ten acres in area, with field house, gymnasium, and covered grandstand, is located about a mile from the university campus. The field house has dressing rooms, lockers, and shower baths; the gymnasium is equipped with basketball and volley ball courts. Here are eleven tennis courts for intercollegiate and intramural tennis. This field includes a playing ground for intercollegiate soccer and a field for intramural baseball and other intramural activities.

Lamberton Hall

The first floor of this building contains the Main Dining Hall for Student use, a Private Dining Room together with a complete Kitchen and Cafeteria counter. The second floor contains a large Faculty Dining Room, pantry and Service Rooms. The basement contains Storerooms and Service Rooms for help.

A portion of the basement is used by the Military Department as a rifle range. This portion contains two indoor rifle and pistol ranges.

The James Ward Packard Laboratory of Electrical and Mechanical Engineering

The late James Ward Packard, who was graduated from Lehigh University in 1884 with the degree of mechanical engineer, the designer of the first Packard motor car, the founder of the Packard Motor Car Company of Detroit, Michigan, and of the Packard Electric Company of Warren, Ohio, donated $1,200,000.00 for the erection and equipment of an electrical and mechanical engineering laboratory.

The Packard Laboratory is a five-story steel-framed sandstone building 225 feet long and 180 feet wide. The lobby is finished in Italian travertine. The halls throughout the building are wainscoted with Tennessee marble. An auditorium on the first floor with a seating capacity of 622 is equipped with still- and talking-motion-picture apparatus.

The western half of the building is devoted to the work of the department of electrical engineering and contains the offices, class rooms, research rooms, and laboratories of the department. The main dynamo laboratory contains over a hundred generators and motors of various types. The high-tension laboratory is equipped with a 150 kv. and a 60 kv. testing transformer, a 700 kv. oscillation transformer, and a source of high d.c. voltage up to 100 kv. The transients laboratory is provided with six magnetic oscillographs, two cathode-ray oscillographs, two artificial transmission lines, a surge generator, and a photographic dark room. A five-unit harmonic phase-shifting motor generator set supplies voltages of various frequencies and wave forms for special tests. The communications laboratory has an extensive equipment of high-frequency measuring apparatus, vacuum-tube circuits, speech amplifiers, and a 40/80 meter transmitter (C.W. or phone) used by the radio club. The wiring system provides for a quick com-

munication and inter-connection between any two parts of the building. A portion of the basement is given to the installation of transforming machinery and switchboard for the laboratory power supply.

The eastern half of the building houses the department of mechanical engineering with offices, drawing rooms, class rooms, research rooms, reading and study room, photographic dark room, shop, instrument rooms, and laboratories. The general laboratory comprises a series of air compressors, steam engines, turbines, and pumps ranging from the simplest types to the ultra modern turbo-generator. Each unit is provided with the necessary auxiliaries for testing. The internal combustion laboratory contains a range of modern internal combustion engines: the simple gasoline engine, the semi-Diesel, ten automobile engines, an aeroplane engine, and two Diesel engines. All of these engines are arranged for connection to dynamometers, water brake, or prony brake such that determinations of efficiency and economy may be readily made. For the laboratry study of the principles of heating, ventilation, air conditioning, and refrigeration, there are available a fully equipped house heating unit and a refrigeration laboratory. The latter contains both an ammonia compressor and a CO_2 compressor which operated in series make possible a cold room temperature of fifty degrees below zero.

Sayre Park

A development of the mountain side of the university grounds was effected through the donation to the University in 1909 of the sum of $100,000.00 by the children of the late Robert H. Sayre, to be used in the development of Sayre Park as a memorial to their father, who was a trustee of the University from its foundation in 1866 to his death in 1907.

The Arboretum

The Arboretum is a tract of about eleven acres adjoining Sayre Park. It was established by a friend of the University as a tree nursery for the purpose of furnishing illustrative specimens of American trees, and of cultivating trees and shrubs for the beautifying of the park. All of the more important species of North American trees are to be found in the university park and the arboretum. Adjoining the Arboretum a tract of seven acres has been planted with a variety of indigenous trees as an exhibition growth of tree culture.

GENERAL REGULATIONS CONCERNING GRADUATION

Eligibility for Degree

To be eligible for a degree from Lehigh University, a student must not only have completed all of the scholastic requirements for the degree, but he must have paid all university fees, and in addition all bills for the rental of rooms in the dormitories, or for damage to university property or equipment, or for any other indebtedness to the University; it being understood, however, that this regulation does not apply to any indebtedness for scholarship loans or for loans from trust funds administered by the University which are protected by properly executed notes approved by the treasurer.

Final Date for Completion of Requirements

For graduation all requirements, scholastic and financial, must have been met by 12 o'clock noon on the Friday preceding the graduation exercises.

Notice of Candidacy for Degree

Candidates for graduation on University Day file with the registrar on or before May 15 a written notice of candidacy for the degree, which notice shall bear the bursar's receipt for the required graduation fee of $10.00; candidates for graduation on Founder's Day file a similar notice of candidacy on or before September 25; candidates for graduation at the Midyear Commencement file such notice on or before January 15. Failure to file such notice by the dates mentioned debars the candidate from receiving the degree at the ensuing graduation exercises. A candidate who pays his graduation fee and then fails to qualify for graduation will, on application, receive a refund of the fee.

MISCELLANEOUS

Graduating Theses

Undergraduate theses, when required, are accompanied by drawings and diagrams, whenever the subjects need such illustration. The originals are kept by the University, as a part of the student's record, for future reference, but copies may be retained by students, and may be published, permission having first been obtained from the faculty.

University Sunday

The Sunday preceding University Day is known as University Sunday, and is devoted to the baccalaureate service. The baccalaureate sermon on May 23, 1943, was preached by Dr. Claude G. Beardslee, University Chaplain.

University Day

University Day marks the close of the academic year. On this day the graduation exercises are held, an address is given, senior honors and prizes are announced, and degrees are conferred. The address at the exercises on May 24, 1943 was given by Harold Willis Dodd, Ph.D., LL.D., President of Princeton University. Certificates of Candidacy for commissions in the Officers Reserve Corps were awarded by Colonel Fay W. Brabson, professor of military science and tactics.

Founder's Day

The first Wednesday in October each year is normally celebrated as Founder's Day in honor of the founder of the University, Asa Packer. Degrees are conferred and freshman and sophomore honors and prizes are announced. On account of the accelerated program of the University, the celebration of Founder's Day was postponed in 1943 to the end of the summer semester.

At the exercises on October 18, 1943, commemorating the seventy-seventh anniversary of the founding, the address was delivered by Señor Rodolfo Michels, LL.D., Ambassador of Chile to the United States.

Mid-Year Commencement

On Sunday, February 20, 1944, a midyear commencement was held. The baccalaureate sermon, in the morning, was preached by Dr. Claude G. Beardslee, University Chaplain; and the address at the graduation exercises in the afternoon was given by Channing Pollock, Litt.D., Dramatist and Author. Degrees and senior honors were awarded.

LEHIGH INSTITUTE OF RESEARCH

The Lehigh Institute of Research was organized in 1924 to encourage and promote scientific research and scholarly achievement in every division of learning represented in the organization of the University, and in recognition of the need for further and

more exact knowledge in science and in the applications of science to the affairs of modern life.

The purposes of the Institute of Research include (1) the training of men for research work, (2) the publication of the results of investigations, (3) the conduct of general research, (4) the conduct of cooperative research, (5) the conduct of commercial tests and advisory service.

Detailed information concerning the organization and regulations of the Institute of Research are given in a pamphlet which will be furnished on request.

RESEARCH FELLOWSHIPS

Graduates in appropriate curricula of colleges, universities, and technical schools whose requirements for graduation are substantially the same as those at Lehigh University are eligible for appointment to the research fellowships listed below. Candidates for fellowships must make application on blanks which will be provided by the University on request. Requests for the blanks should be addressed to the dean of the Graduate School, Lehigh University, Bethlehem, Pa. Applications must be filed on or before March 1. Each application must be accompanied by a certificate of the candidate's college work, a statement concerning his practical experience, and any other evidence of his qualifications which he may choose to submit. An applicant must indicate the line of graduate study he desires to undertake and his special qualifications for such work.

A holder of a fellowship may not accept any employment for pay without the written permission of the dean of the Graduate School.

Holders of fellowships, who also pursue graduate work at the University, are exempt from the payment of the university tuition fee.

New Jersey Zinc Company Research Fellowship

The New Jersey Zinc Company provided funds in 1924 for a research fellowship to be known as the New Jersey Zinc Company Research Fellowship.

Appointment to this fellowship is for the period of two academic years, beginning September 1 and ending June 30, with an annual stipend of $600.00 payable in ten installments, Half of

the time of the holder of this fellowship must be devoted to research work in the department to which he is assigned; the other half to graduate study leading to a master's degree at the end of the two-year appointment, provided all university requirements for this degree have been satisfied. The holder of this fellowship is required to devote approximately ninety hours a month, exclusive of university holidays, to research work assigned to him in the department to which he is attached.

The Henry Marison Byllesby Memorial Research Fellowships

In 1926 Mrs. H. M. Byllesby, widow of Col. H. M. Byllesby, M.E., '78, President of the Byllesby Engineering and Management Corporation, provided an endowment fund for the establishment of the Henry Marison Byllesby Memorial Research Fellowship in Engineering.

Appointment to these fellowships are for two academic years with an annual stipend of $750.00 payable in ten instalments. Half of the time of the holders of these fellowships must be devoted to research work on some problem in electrical, mechanical, or hydraulic engineering, proposed by the President of the Byllesby Engineering and Management Corporation and approved by the Lehigh Institute of Research; the other half to graduate study leading to the degree of Master of Science at the end of the two-year appointment, provided all university requirements for this degree have been satisfied.

The James Ward Packard Research Fellowships in Electrical or Mechanical Engineering

The income from a bequest from James Ward Packard, M.E., '84, provides for a research fellowship in either electrical or mechanical engineering. Appointment to this fellowship is for a period of two academic years, with an annual stipend of $600.00.

The C. Kemble Baldwin Research Fellowships in Aeronautics

A fund provided by Mrs. C. Kemble Baldwin as a memorial to her husband, C. Kemble Baldwin, M.E., '95, provides for the occasional appointment of a research fellow in any branch of science having a bearing on the field of aeronautics. Appointment to this fellowship is for a period of two academic years, with an annual stipend of $750.00.

The Lawrence Calvin Brink Research Fellowship in Civil Engineering

A fund provided by the late Mrs. L. C. Brink as a memorial to her husband, Lawrence Calvin Brink, C.E., '94, provides for the occasional appointment of a research fellow in civil engineering. Appointment to this fellowship is for a period of two academic years, with an annual stipend of $600.00.

The Student Chemistry Foundation Fellowships

In the spring of 1927, members of the class of 1930 established the Student Chemistry Foundation in honor of Harry M. Ullmann, then head of the department of chemistry. Subsequent classes have contributed to the fund. This fund provides two research fellowships, for which Lehigh University graduates only are eligible. Appointments to these fellowships are for a period of two academic years, with an annual stipend of $600.00.

The Garrett Linderman Hoppes Research Fellowship in Civil Engineering

A research fellowship in civil engineering was established by the late Mrs. Maria B. Hoppes in memory of her son, the late Garrett Linderman Hoppes, C.E., '83. Appointment to this fellowship is for a period of two academic years, with an annual stipend of $600.00.

The William L. Heim Research Fellowship in Chemistry

A research fellowship in chemistry was established by William L. Heim, B.S., in Chem. '02. Appointment to this fellowship is for a period of two academic years, with an annual stipend of $600.00. The research at present is in the field of X-ray analysis.

The Roy R. Hornor Research Fellowship in Metallurgy and Inorganic Chemistry

The income from a bequest by Roy R. Hornor, B.S., '99, provides for a research fellowship in either metallurgy or inorganic chemistry. The appointment is for two years with an annual stipend of $600.00. The holder of this fellowship will devote half-time to research under the direction of the faculty, and half-time to graduate study. While the appointment will generally be made alternately between the metallurgy department and the chemistry department, it may be determined by the qualifications of available candidates.

The Katharine Comstock Thorne Fellowship in Biology

The late Gordon Comstock Thorne of the class of 1916 endowed the Katharine Comstock Thorne Fellowship in Biology in memory of his mother. The appointment is for two years at a stipend of $500.00 annually and free tuition. The appointee will devote half his time to research in the department and half his time to graduate study.

A research fellowship in metallurgy was established by John H. Frye, Sr. Appointment to this fellowship is for a period of two academic years, with an annual stipend of $600. The research at present is in the field of physical metallurgy.

Industrial Research Fellowships

Lehigh University cooperates with industrial concerns in offering fellowships for the study of research problems along specialized lines. The following industrial research fellowships have been established.

The American Institute of Steel Construction Research Fellowships for research in steel construction. Two fellowships with an annual stipend of $600.00.

The American Bureau of Welding Research Fellowship for research in electric welding. One fellowship with an annual stipend of $600.00.

Seton Leather Company Fellowship for research in leather technology. One fellowship with an annual stipend of $720.00.

Raybestos-Manhattan Company Fellowships for research in asbestos products and brake linings. Two fellowships with an annual stipend of $720.00.

The Devoe and Raynolds Company Research Fellowship for research in the field of colloid chemistry. One fellow ship with an annual stipend of $600.00.

National Oil Products Company Fellowships for research in textile oils. Two fellowships with an annual stipend of $600.00.

Mutual Chemical Company of America Fellowship for research in chromium compounds. One fellowship with an an nual stipend of $600.00.

CORN PRODUCTS REFINING COMPANY RESEARCH FELLOWSHIP IN LEATHER TECHNOLOGY. One fellowship with an annual stipend of $600.00.

ENDOWMENT OF FELLOWSHIPS

Research fellowships named in honor of an individual or a corporation offering opportunities for graduate work and training in research in any designated field of study may be established in perpetuity through the payment to the board of trustees of $20,000.00. The income from this fund will be paid to the holder of the fellowship after the deduction of his tuition and laboratory fees. If a bequest for the establishment of a fellowship provides for half-time service as a research assistant in the Institute of Research, the remaining time to be devoted to graduate study, the University will remit the tuition fee and make only such charges against the fund as are necessary to cover the cost of materials, supplies, and apparatus that need to be provided for the work of the fellow.

DEGREES

DEGREES CONFERRED ON UNIVERSITY DAY, MAY 24, 1943

Honorary Degrees

DOCTOR OF ENGINEERING

Per Keyser Frolich
Chemical Director, Standard Oil Development Company

Nevin Elwell Funk
Vice-president, Philadelphia Electric Company

Alfred Robinson Glancy
Chief of Ordnance, OPM; Director, Service of Supply

DOCTOR OF LAWS

Rodolfo Michels
Chilean Ambassador to the United States

Degrees in Course

PROFESSIONAL DEGREES

Civil Engineer

Francis Louis Ehasz, B.S. in C.E., M.S., Ph.D. (*New York University, Lehigh University)*

MASTER OF ARTS

Major in Education

Daniel Irvin Farren, B.S. *(Muhlenberg College)*
Donald Ernest Fritchman, B.S. in Ed. *(Kutztown State Teachers College)*
Ira Paul Handwerk, A.B. *(Lafayette College)*
Norman Arnold Laub, B.S. *(Kutztown State Teachers College)*
Edwin Enos Leidich, B.S. *(Muhlenberg College)*
Myron Stettler, B.S. *(West Chester State Teachers College)*

Major in English

Pauline Barnhart Rupp, A.B. *(Cedar Crest College)*
Adelaide Emilie Shields, A.B. *(Moravian College for Women)*

Major in History

Walter Frances Daney, Ph.B. *(Muhlenberg College)*
Russell Henry Kistler, A.B. *(Muhlenberg College)*

MASTER OF SCIENCE

Major in Biology

Robert Murdoch Lewert, B.S. *(University of Michigan)*

Major in Chemistry

Henry Clarkson Green, B.S. *(Hampden-Sydney College)*
Raymond Charles Hess, B.S. *(Lebanon Valley College)*
Moulton Davis Phelps, B.S. in Chem. *(Randolph-Macon College)*
Richard Kreider Walton, B.S. *(Albright College)*
Earl Alvin Zettlemoyer, B.S. *(Muhlenberg College)*

Major in Civil Engineering

Joseph Leon Brandes, B.C.E. *(Rensselaer Polytechnic Institute)*
Andrew Brodsky, B.S. in C.E. *(University of Alabama)*

Major in Mechanical Engineering

Robert Carl Dimmich, B.S. in I.E. *(Lehigh University)*

Major in Metallurgical Engineering

Marion Clifford Rowland, B.S. in Met.E. *(South Dakota School of Mines)*
Chen-Pao Sun, B.S. *(Cheeloo University)*

BACHELOR OF ARTS

Richard Turney Berg
Robert Louis Bird
William Thomas Buhrig
Wayne Hanley Carter, Jr.
Roy Burford Cowin, Jr.
Niel Stahley Culliney
John Seaton Curtis
Henry Edward de Jongh
Louis Field Dellwig
Lewis Friedman
Randall Clinton Giddings
Franklin Himmelberger
Joseph Francis Kemmer
Howard Clifford Leifheit
Roydon Seymour Margolies
John Joseph Meehan, Jr.
Quentin Dewey Mehrkam
Alan Cameron Mermann
Richard Bradbury Palmer
Alan Edward Price
George Horace Ried
Robert Seymour Rumsey
John Donald Ryan
Clarence Arthur Stearns, Jr.
Peter John Weigel
William Robert Williams
George William Wolfsten, Jr.

BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION

Arthur Kirke Bartley
Charles Richard Bergh
Richard Henry Bernasco
Andrew Harrison Brennan
Thomas Lee Bushey
George John Bussmann
Francis Arndt Chidsey, Jr.
Jon Conforte
Donald Henry Davies
Bernard William Deehan
Leo Worth Dieffenbach
Clarence Franklin Fehnel, Jr.
Roy Norman Figueroa
Michael Louis Geiger
Thomas Herman Golden
Vincent Frank Grasso
David Evans Gregory
Philip Scott Guckes
Robert Edwin Harnisch
Burt Lewis Heimer
Barton Royal Heinz
William Bane Holberton
Andrew Fredrick Leckie, Jr.
Charles Lowell Liebau, Jr.
Jackson Froelicher Mitchell
Franklin LeCron Morgal
Elbridge William Palmer
Donald Bruce Parish
Kenneth Porter, Jr.
John Samuel Reichard
Robert Mack Schantz
Joseph Pidgeon Thomas, Jr.
Philip Thomas Varricchio
Albert Francis Von Block
Franklin Haldeman Young

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

Elwood Bruce Backensto
Robert Carlton Boston
Edwin Harold Dafter, Jr.
Edward Stowman Davis
Charles Joseph Dick
Norman Joseph Faber
R. William Hinterleiter
John Joseph Hucker
Robert Clayton Kramer
Arthur Lewis Landesman
William McGee
Chandler Hayes McKaig
Ewen Montford Mortimer, Jr.
Hugh Warren Richards
Rodney Daniel Shaffer
Robert Edwin Siegfried
Charles Wesley Stahl
Philip Adams Thomas
Joseph Anthony Wantuck
Nathan Leland Wilson, Jr.

BACHELOR OF SCIENCE IN CHEMISTRY

Wiflet Ellsworth Egge, Jr.
Edward Adam Fehnel
Isaac Moyer Hunsberger
Richard Earle Miller
Harold Russ Nace
Robert Willmar Pugh
Richard Winfield Sauer
Warren Joshua Schwab
Carl Arthur Streuli
Robert Parsons Whipple
James William Woods

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

John Henry Brubaker, Jr.
Rosario Roy Dragone
Robert Joseph Fisher
John Raymond Gray
John Houseman
John Joseph McGee
Robert Condit Moore
Ralph Dominick Palazzo
David Henry Schaper
Lester Edwin Titlow

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Charles Surface Bennett
Taylor Albert Birckhead
Frank Hugo Bower
Stanley Caplan
William Henry Clark, Jr.
Samuel Jackson Davy
Richard Milton Haslet
Robert Leon Hill
Warren Edward Hoffman
William Anthony Kuhar
Nathan George Lesh
Thomas Crawford MacAllister, Jr.
Warren King Morgan, Jr.
Francis Haynes Rockett, Jr.
Charles Elias Sieger
Paul McNeel Thrasher, Jr.
Walter Stockton Titlow, Jr.
David Irvin Troxel
Richard Rolland Waer

BACHELOR OF SCIENCE IN ENGINEERING PHYSICS

Maynard Goodwin Arsove
William Conner Brower
William Moss Strouse

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

Robert Dudley Bailey
Burton Eberman Bauder
Herbert Edward Bunning
Solomon Pusey Caldwell
Robert Edward Coffman
Charles Dwight Curtiss, Jr.
Chester Lee Finch, Jr.
Robert Watson Fuller
Joseph Cyril Gabuzda
William Daniel Hayes
Alan Dabney Hinrichs
Theodore Kelechava
Kenneth Harold Norris, Jr.
James Schriever Smith
John Montague Stockbridge
Charles McDowell Thompson
Robert Weller
Arthur John White, Jr.

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Edward George Boyer, Jr.
Thomas Mathieu Buck
Edward Jerome Cavanaugh
Edgar Russell Conover, Jr.
William Harrison Eichlin, Jr.
Musa Joseph Eways
Robert High Freeman
Henry Watterson Garvin, Jr.
Wheeler Gilmore, Jr.
John Richard Greiner
Albert Weimer Hemphill, Jr.
Fenwick Peck Horn
William Edward Irvin, Jr.
Donald Seiz Johnson
Harvey Donald Moll
John Haines Mueller
Harvey Hans Nelken
Harry Lester Olmstead, Jr.
Arthur Mead Over
Philip Henry Powers, Jr.
Clarence Orland Prinkey
Arthur Elford Roslund
Donald George Sanders
Anthony Joseph Santantonio
Herbert Owen Schutt
Joseph Earl Smith, Jr.
Quentin Cletus Soprano
Philip Anthony Sweet, Jr.
John Platt Townsend
Ralph Wittman
Allan Ehrman Wolf
Guy Crawford Worrell, Jr.

BACHELOR OF SCIENCE IN METALLURGICAL ENGINEERING

John Hughes Corson
William Thomas DeLong
Leon Joseph McGeady
Paul Lavern Nestleroth
Charles McMillan Norlin
Richard Mitchell Treco

BACHELOR OF SCIENCE IN MINING ENGINEERING

Thomas Paisley Bradford
Robert Harry Holland
Harry Archibald Reichenbach, Jr.

CERTIFICATES OF CANDIDACY FOR COMMISSIONS IN THE OFFICERS' RESERVE CORPS

Members of the Graduating Class

Air Corps

Henry Watterson Garvin, Jr.
William Edward Irvin, Jr.
Herbert Owen Schutt
John Platt Townsend
Ralph Wittman
Guy Crawford Worrell, Jr.

Chemical Warfare Service

Edwin Harold Dafter, Jr.
Lewis Friedman
R. William Hinterleiter
William Caspar Kirschner
Arthur Lewis Landesman
Howard Clifford Leifheit
Chandler Hayes McKaig
Robert Edwin Siegfried
Philip Adams Thomas
Joseph Anthony Wantuck
James William Woods

Corps of Engineers

John Henry Brubaker, Jr.

Infantry

Richard Turney Berg
Richard Henry Bernasco
Andrew Harrison Brennan
George John Bussmann
Wayne Hanley Carter, Jr.
Francis Arndt Chidsey, Jr.
Roy Burford Cowin, Jr.
Donald Henry Davies
Bernard William Deehan
Louis Field Dellwig

Thomas Herman Golden
Vincent Frank Grasso
Barton Royal Heinz
Franklin Himmelberger
William Bane Holberton
Andrew Fredrick Leckie, Jr.
Charles Lowell Liebau, Jr.
John Joseph McGee
John Joseph Meehan, Jr.
Franklin LeCron Morgal
Elbridge William Palmer
Richard Bradbury Palmer
Donald Bruce Parish
Kenneth Porter, Jr.
John Samuel Reichard
George Horace Ried
Robert Seymour Rumsey
John Donald Ryan
Clarence Arthur Stearns, Jr.
Joseph Pidgeon Thomas, Jr.
Albert Francis Von Block
William Robert Williams

Ordnance

Robert Dudley Bailey
Robert Carlton Boston
Edward George Boyer, Jr.
Thomas Mathieu Buck
Stanley Caplan
John Hughes Corson
John Seaton Curtis
Willet Ellsworth Egge, Jr.
Chester Lee Finch, Jr.
Robert High Freeman
Robert Watson Fuller
William Daniel Hayes
Albert Weimer Hemphill, Jr.
Robert Harry Holland
John Joseph Hucker
Theodore Kelechava
William McGee
Ewen Montford Mortimer, Jr.
John Haines Mueller
Paul Lavern Nestleroth
Harry Lester Olmstead, Jr.
Arthur Mead Over
Philip Henry Powers, Jr.
Clarence Orland Prinkey
Donald George Sanders
Anthony Joseph Santantonio
Quentin Cletus Soprano
Charles Wesley Stahl
Philip Anthony Sweet, Jr.
Charles McDowell Thompson
Allan Ehrman Wolf

Signal Corps

William Conner Brower
Nathan George Lesh
Thomas Crawford MacAllister, Jr.
Warren King Morgan, Jr.
Charles Elias Sieger
Walter Stockton Titlow, Jr.

UNDERGRADUATES

Air Corps

William Kouwenhoven Remsen, Jr.

Chemical Warfare Service

Albert Robert Tucker, Jr.

Infantry

Charles Armond Johnson
Charles Montgomery Rogers
Theodore Wielkopolski

Ordnance

John Joseph Maloney, Jr.
James Bruce Price, Jr.

DEGREES CONFERRED ON FOUNDER'S DAY
OCTOBER 18, 1943

Degrees in Course

DOCTOR OF PHILOSOPHY

Major in Physics

Robert August Buerschaper, B.S. in Eng.Phys., M.S. *(Lehigh University)*

MASTER OF ARTS

Major in Education

Clarence M. Gockley, B.S. *(Muhlenberg College)*
John William Sabatine, B.S. *(Muhlenberg College)*
Karl Roy Schneck, B.A. *(Lehigh University)*

Major in History

Anna Gernert Shankweiler, A.B. *(Cedar Crest College)*

MASTER OF SCIENCE

Major in Chemistry

John Rusweiler Cann, B.S. *(Moravian College)*
George Douglas Nelson, B.S. *(Randolph-Macon College)*

Major in Civil Engineering

John Howard Dawson, B.S. in C.E. *(State University of Iowa)*
George Packer, B.C.E. *(College of the City of New York)*
Dario Rodriguez, C.E. *(University of Chile)*

Major in Mechanical Engineering

Bela Kalman Erdoss, Dipl. Ing. *(Royal Joseph University of Engineering)*

BACHELOR OF ARTS

Walter Lesesne Anders
Stuart Marsh Ellsworth, Jr.
Albert Guy Ferdinand
Robert Dale Gilmore
Carl Lehnert Greener
Ernest John Gsell
Robert Irwin Jaslow
Robert Michael McInerney
Courter Dickinson Mills
Laurance Austin Mosier
Robert Cole Ramsdell
Hubbard William Shawhan, Jr.
Frank Ward Voelcker

BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION

Harry Wallis Anderson, Jr.
Andrew Murad Bardagjy
Joseph Frank Bonin
Ray Edwin Brawn
George Buckner II
Charles Bowles Chrisman
Joel Gerhard Clemmer, Jr.
Joseph Gordon Compton
Robert Lloyd Coutts, Jr.
John Edmund Devitt
Robert Henry Doney
Danal Paul Epstein
William Henry Fisher
Dale Youngman Freed
William Bushnell Hinman
Charles Armond Johnson
LeRoy Ordway King, Jr.
William Louis Kronthal

Gaynor O. H. LeRoy
I. Harrison Levy
William Fowler Metten, Jr.
Philip Horace Miller
James Paul Mulhern
Robert Martin Paddock
Charles Montgomery Rogers
John David Smith
Guy Walter Tench
Bruce W. Thayer
William Taylor Wenck

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

Frank Vincent John Camarda
Charles Russell Conklin, Jr.
Fred Gruenwald
Claude Jennings Kurtz
Stephen Kutosh
William Charles McJames
Theodore Peters, Jr.
John Alexander Ross
Albert Robert Tucker, Jr.
Glenn Creasy Wanich

BACHELOR OF SCIENCE IN CHEMISTRY

William Caspar Kirschner
Joseph James Kurtz
Robert Roland Ressler

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Dudley Coles
Ward Arnold Detwiler II
James Henry Galli
Toshiaki Shintaku

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Edward Ludlam Blossom, Jr.
Hugh Bartley Frey, Jr.
Kay Felix Miskinis
Earle Wilbur Wallick, Jr.

BACHELOR OF SCIENCE IN ENGINEERING PHYSICS

David Fredrick Cox
John Athan Karas
Ulysses Frederick Kleckner

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

Earl Albert Brawn
William Kouwenhoven Remsen, Jr.
William Beauchamp Tilghman

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Philip James Berg
William Howard Hebrank
Robert Allen Heironimus
Robert Wilson Rouse
Paul William Sanders
Quirin John Schwarz
Vigor Cranston Smith
Samuel Idell Snyder
Kenneth Gilbert Swayne
Jay Louis Weening
Theodore Wielkopolski
John Michael Williams

BACHELOR OF SCIENCE IN METALLURGICAL ENGINEERING

Frank Berman
Joseph John Buczynski, Jr.
Robert Leslie Cahoon
Bernard John Egan
Edward Lyster Frost
John Louis Gretz
Richard Baldwin Hendrick
Charles Carlson Hilton
Robert Martin Long
Donald McFaul Lorimer
Robert John Pfisterer
Robert Bertram Rauer
Joseph Eyged Schmuk

BACHELOR OF SCIENCE IN MINING ENGINEERING

John Joseph Maloney, Jr.

CERTIFICATES OF CANDIDACY FOR COMMISSIONS IN THE OFFICERS' RESERVE CORPS

MEMBERS OF THE GRADUATING CLASS

Infantry

Joseph Frank Bonin
Robert Dale Gilmore
Robert John Pfisterer
William Kouwenhoven Remsen, Jr.
Charles Montgomery Rogers
Hubbard William Shawhan, Jr.
John David Smith
Albert Robert Tucker, Jr.
Theodore Wielkopolski

Ordnance

William Howard Hebrank

DEGREES CONFERRED ON MIDYEAR COMMENCEMENT DAY, FEBRUARY 20, 1944

Degrees in Course

MASTER OF ARTS

Major in Education

Carl Ernest Hightower, A.B. *(Taylor University)*

MASTER OF SCIENCE

Major in Bacteriology

Dale Ackley Harris, B.A. *(Lehigh University)*

Major in Physics

William Bailey Agocs, B.S. in E.M. *(Lehigh University)*

BACHELOR OF ARTS

Irving Reid Collmann
John Paul Delich
Donald Malcolm Feigley
Philip James Gahagan
David Franklin Gearhart
Hibbard Gustave Gumpert, Jr.
André Jean Emile Leroux
Creighton Lamar Lytle
John Robert Munford
Joseph Francis O'Brien
David Phineas Scobey
Robert R. Shively
Wilson Pershing Snyder
Roland C. Stoehr
William Robb Sultzer
Paul Stephen Tremel

BACHELOR OF SCIENCE IN BUSINESS ADMINISTRATION

Alfred Joseph Cornelius
Henry Christian Ost, Jr.
William Charles Stoeckle
Robert Arthur Wiley

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

James Milbourne Cordrey
Robert Frederick Dieter
Blaine Donald Ferrell
Jack Clifford Fitch
George Gawthrop, Jr.
Alexander C. Hetherington
Andrew Mitchell III
Robert Kistler Schmoyer
Harold DeWitt Sherwood
Joseph Newkirk Tomlinson

BACHELOR OF SCIENCE IN CHEMISTRY

C. Theodore Kleppinger

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Richard Lee Gerhart
Joseph Albert Paternoster, Jr.
Robert Louis Smith

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Max William Bellis
David Wagener Green
John Marius Kennedy
John Lewis Edward Kratzer
Robert Harris Mathes
Lewis Franklin Page
Paul James Ray, Jr.
Leon George Reimer

BACHELOR OF SCIENCE IN ENGINEERING PHYSICS

George Harvey Brower

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

David Franklin Gearhart, B.A. *(Lehigh University)*

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Alfred Aron Adler
John Charles Black
John Evans Doxsey
Oscar Edwin Fox, Jr.
Robert Holliday Hicks, Jr.
Lewis Warner Hill
James Allison Hosford
Russell Cornelius Jordan
Donald Randolph Lowry, Jr.
James Sutherland Marsh
George William McKnight
Robert Irwin Moss
Glenn Allan Murray
Joseph Raymond Ristorcelli
Leonard Charles Schwab
Peter Charles Seaton
William Harold St. Clair
David Truman Steele
Eugene Sewell Stowers, Jr.
Merlin Paul Walters

BACHELOR OF SCIENCE IN METALLURGICAL ENGINEERING

William Edward Cavanagh, Jr.
Warren Richard Dix
John Francis Donahue
John Hammes Gross
William Charles Hittinger
Theodore George Megas
John Carl Yastrzab

BACHELOR OF SCIENCE IN MINING ENGINEERING

Charles Norman Charest

CERTIFICATES OF CANDIDACY FOR COMMISSIONS IN THE OFFICERS' RESERVE CORPS

Members of the Graduating Class

Infantry

Alfred Joseph Cornelius
John Marius Kennedy
Joseph Francis O'Brien
Henry Christian Ost, Jr.
Wilson Pershing Snyder
William Charles Stoeckle
Paul Stephen Tremel
Robert Arthur Wiley

Ordnance

Max William Bellis
Blaine Donald Ferrell
Jack Clifford Fitch
William Charles Hittinger
André Jean Emile Leroux
George William McKnight
Eugene Sewell Stowers, Jr.
John Carl Yastrzab

COMMISSION AS SECOND LIEUTENANT IN THE UNITED STATES MARINE CORPS RESERVE

Glenn Allan Murray

HONORS

HONORS ANNOUNCED ON UNIVERSITY DAY MAY 24, 1943

Graduation Honors

GRADUATED WITH HIGHEST HONORS

Maynard Goodwin Arsove
Stanley Caplan
Isaac Moyer Hunsberger
Donald Seiz Johnson
George Horace Ried

GRADUATED WITH HIGH HONORS

Charles Surface Bennett
Edward Adam Fehnel
John Joseph Meehan, Jr.
Richard Rolland Waer

GRADUATED WITH HONORS

Robert Dudley Bailey
Thomas Mathieu Buck
Charles Dwight Curtiss, Jr.
Edwin Harold Dafter, Jr.
William Thomas DeLong
Roy Norman Figueroa
Lewis Friedman
Randall Clinton Giddings
Wheeler Gilmore, Jr.
Franklin Himmelberger
Warren Edward Hoffman
William Bane Holberton
Nathan George Lesh
Robert Condit Moore
Franklin LeCron Morgal
John Haines Mueller
Harold Russ Nace
Richard Bradbury Palmer
Donald Bruce Parish
Philip Henry Powers, Jr.
Hugh Warren Richards
Robert Edwin Siegfried
Quentin Cletus Soprano
Arthur John White, Jr.
William Robert Williams
Franklin Haldeman Young

GRADUATED WITH SPECIAL HONORS

Chemistry

Edward Adam Fehnel

Greek

George Horace Ried

Industrial Engineering

Arthur John White, Jr.

Mathematics

Maynard Goodwin Arsove

Mechanical Engineering

John Haines Mueller

HONOR GRADUATES IN THE RESERVE OFFICERS' TRAINING CORPS

Infantry

John Joseph Meehan, Jr.
Elbridge William Palmer
George Horace Ried
Joseph Pidgeon Thomas, Jr.
William Robert Williams

Ordnance

Robert Carlton Boston
Chester Lee Finch, Jr.
William Daniel Hayes
John Joseph Hucker
Philip Henry Powers, Jr.

HONORS ANNOUNCED ON FOUNDER'S DAY OCTOBER 18, 1943

Graduation Honors

GRADUATED WITH HIGHEST HONORS

Theodore Peters, Jr.

GRADUATED WITH HIGH HONORS

David Frederick Cox
I. Harrison Levy

GRADUATED WITH HONORS

Philip James Berg
Joseph John Buczynski, Jr.
John Edmund Devitt
Dale Youngman Freed
Edward Lyster Frost
John Louis Gretz
Robert Irwin Jaslow
Claude Jennings Kurtz
Stephen Kutosh
Robert Roland Ressler
Kenneth Gilbert Swayne
Frank Ward Voelcker

Freshman and Sophomore Honors

(Awarded to those members of the freshman and sophomore classes who made an average grade of 3.00 or higher)

FRESHMAN HONORS

Eugene Walther Baer III
Edward Talcott Barnes
Maurice Bick
Paul Robert Buehler
William Preston Colman
Robert Bartlett Curtis
David Kaufman Davies
John Lester Dietche
Stanley Edward Eisenhard
Allen Judson Ely, Jr.
David Hunden Evans
Aaron Franklin Hahn
Glenn Erwin Handwerk
William Edson Hardy
Carl Wilhelm Helstrom
John Lloyd Hertig
Ralph Wayne Kraft, Jr.
Frank H. Marsh, Jr.
Robert Walter Mayer
Leslie Guy McCracken, Jr.
Richard Joseph Mikovsky
Victor Warren Fox, Jr.
John Wesley Morrison
Joseph Sixtus Oechsle
Edwin Thomas Pieski
Seemon Hayden Pines
William Frederick Reehl
Donald Frey Ressler
Robert Benjamin Rosener
Walter Gerald Sall
David Crawford Schubert
Norman Castor Sidebotham
Max Harvey Stettner
Frederick Laurent Test
George Harold Wagner
Roy Clemson Ward
Charles Lafayette Winters, Jr.
William Charles Wittmann, Jr.
Donald Alan Wolf
Richard Nehring Zirnite

Sophomore Honors

Alan Chichester Abeel, Jr.
Keith Warren Amish
Paul Chapman Andrews
Gilbert Justin Barenborg, Jr.
Frederick William Bloecher, Jr.
Richard Henry Boll
Ira Brahm Born
Donald Roger Diggs
Louis Martin Domeratzky
Ralph Aiken Evans
Paul Justus Franz, Jr.
Harry Joshua Gray, Jr.
Austin Thomas Hunt, Jr.
David Clark Kirk, Jr.
Burt Ben Lasko
Joseph Robert Lasser
Richard Maxwell Leiter
Stephen James Litrides
Leslie Ralph Little, Jr.
Edward George Manning
John William Matthews
Stephen Bowne McElroy
Albert Slocomb Perley
Louis Moosbrugger Richards
Harry Benson Shuttleworth
William Frank Thompson, Jr.
Richard Rhys Williams

HONORS ANNOUNCED ON MIDYEAR COMMENCEMENT DAY, FEBRUARY 20, 1944

Graduation Honors

GRADUATED WITH HIGHEST HONORS

Robert Louis Smith

GRADUATED WITH HIGH HONORS

Glenn Allan Murray
David Phineas Scobey

GRADUATED WITH HONORS

Alfred Aron Adler
Max William Bellis
Irving Reid Collmann
Donald Malcolm Feigley
Blaine Donald Ferrell
Jack Clifford Fitch
Hibbard Gustave Gumpert, Jr.
William Charles Hittinger
John Robert Munford
John Carl Yastrzab

PRIZES

PRIZES ANNOUNCED ON UNIVERSITY DAY MAY 24, 1943

WILLIAMS SENIOR PRIZE IN ENGLISH

Second Prize, $25
John Joseph Meehan, Jr.

WILLIAMS SENIOR PRIZE IN PHILOSOPHY

Second Prize, $25
Robert Kingdon Beckwith

WILLIAMS SENIOR PRIZE IN PSYCHOLOGY

Second Prize, $25
Clarence Arthur Stearns, Jr.

WILLIAM H. CHANDLER CHEMISTRY PRIZE, $25—to the highest ranking senior in the curricula in chemistry and chemical engineering
Isaac Moyer Hunsberger

AMERICAN INSTITUTE OF CHEMISTS MEDAL
Isaac Moyer Hunsberger

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS' STUDENT MEMBERSHIP PRIZE
Frank Hugo Bower

JOHN B. CARSON PRIZE, $50—for the best record in professional courses in civil engineering
Robert Condit Moore

PHILIP FRANCIS DUPONT MEMORIAL PRIZES IN ELECTRICAL ENGINEERING—for the top-ranking seniors

First Prize, $60
Stanley Caplan

Second Prize, $30
Richard Rolland Waer

HAROLD J. HORN PRIZES IN ELECTRICAL ENGINEERING PROSEMINAR

First Prize, $10
Taylor Albert Birckhead

Second Prize, $5
Stanley Caplan

AMERICAN SOCIETY OF CIVIL ENGINEERS JUNIOR MEMBERSHIP PRIZE
Robert Condit Moore

American Society of Mechanical Engineers Junior Membership Prize

Philip Henry Powers, Jr.

American Chemical Society Award—to the highest ranking senior in chemistry or chemical engineering

Isaac Moyer Hunsberger

PRIZES ANNOUNCED ON FOUNDER'S DAY OCTOBER 18, 1943

Wilbur Scholarship, $200—to the highest ranking sophomore

Richard Rhys Williams

Wilbur Prizes, Freshman Year

Mathematics

First Prize, $15

Carl Wilhelm Helstrom

Second Prize, $10

Roy Clemson Ward

English, $15

Carl Wilhelm Helstrom

French, $15

Charles Lafayette Winters, Jr.

Wilbur Prizes, Sophomore Year

Mathematics, $10

Leslie Ralph Little, Jr.

English, $10

David Marlette John

Physics, $10

Donald Frey Ressler

Williams Senior Prize in Economics

Second Prize, $25

I. Harrison Levy

Williams Sophomore Prizes in English Composition

First Prize, $50

Lee Alfred Greenbaum, Jr.

Second Prize, $25

Francis Charles Taylor

Third Prize, $15

Alfred Searles Cook, Jr.

WILLIAMS JUNIOR PRIZES IN ENGLISH COMPOSITION

First Prize, $50
Royal Emerson Peterson II

Second Prize, $25
Hibbard Gustave Gumpert, Jr.

Third Prize, $15
Herbert George Lauterbach

WILLIAMS PRIZES IN INTRAMURAL DEBATING

First Prizes, $60
Lewis Warner Hill
Wilbur Ralph Peters, Jr.

Second Prizes, $40
Jerome Yale Neff
Aaron L. Kestenbaum

ELECTRICAL ENGINEERING PRIZE, $15—to the highest ranking sophomore in electrical engineering
Harry Joshua Gray, Jr.

WILLIAM H. CHANDLER CHEMISTRY PRIZES—to the highest ranking student in each class in chemistry and chemical engineering

Freshman Year, $25
William Preston Colman

Sophomore Year, $25
Richard Henry Boll

Junior Year, $25
Theodore Peters, Jr.

JOHN R. WAGNER AWARD, $15—to the highest ranking student in mechanical engineering during his first two years
Louis Martin Domeratzky

ALUMNI JUNIOR PRIZES—to the highest ranking juniors in each of the three Colleges of the University

Arts and Science, $25—Divided between
David Phineas Scobey
Frank Ward Voelcker

Business Administration, $25
I. Harrison Levy

Engineering, one prize, $25
Carl Richard Ingemanson

Engineering, one prize, $25
Theodore Peters, Jr.

TAU BETA PI PRIZE, $20—to the highest ranking freshman in engineering
Divided between
Stanley Edward Eisenhard
Carl Wilhelm Helstrom

PI TAU SIGMA MECHANICAL ENGINEERING PRIZE (Engineer's Handbook)—to the highest ranking freshman in mechanical engineering
William Edson Hardy

PI TAU SIGMA INDUSTRIAL ENGINEERING PRIZE (Engineer's Handbook)—to the highest ranking freshman in industrial engineering
Joseph Stephen Rengert

PHI SIGMA KAPPA SCHOLARSHIP CUP—awarded for one year to the fraternity having the highest scholastic average for the year
Tau Delta Phi

TRUSTEES' SCHOLARSHIP CUP—awarded for one year to the living group having the highest scholastic average for the year
Leonard Hall

Register of Students
1943 - 1944

STUDENTS 1943-1944

GRADUATE STUDENTS, SUMMER SEMESTER, 1943, FALL AND SPRING SEMESTER, 1943-44

In the following list of graduate students, an entry such as "Major: Chemistry" signifies that the student has been admitted to candidacy for the master's degree with a major in the field indicated. An entry such as "Major*: Chemistry" signifies that the student has been admitted to candidacy for the doctor's degree in the field indicated.

Abel, Kenneth Paul — Nazareth
A.B. (*Lafayette College*).

Adams, Anne Wysoka — Bethlehem
B.S. (*Muhlenberg College*). Major: Education.

Arnold, Phoebe Elizabeth — Bethlehem
B.A. (*Moravian College for Women*).

Ashbaugh, Laura McDonough — Bethlehem
B.A., M.A. (*University of Pennsylvania*).

Askren, Lee Terrell — Bethlehem
B.S. in M.E. (*Purdue University*). Major: Mechanical Eng.
Instructor in Mechanical Engineering.

Barthold, Harold Joseph — Bethlehem
A.B. (*Muhlenberg College*). Major: Education.

Beacher, Isabel Bury — Allentown
B.S. (*Cedar Crest College*)

Becker, Barbara Alice — Bethlehem
A.B. (*Allegheny College*). Major: History.

Bentz, Ralph Wagner — Reading
B.S. (*Albright College*). Major: Chemistry.
Devoe and Raynolds Company Research Fellow.

Bergmann, Margot Eisenhardt — Bethlehem
M.S. (*Rutgers University*).

Bock, Emmett Wilson — Lehighton
B.S. (*Franklin and Marshall College*).

Borkowski, Walter Leonard — Camden, N. J.
B.S. (*University of Pennsylvania*). Major: Chemistry.

Boyer, Miriam Lathea — Allentown
B.S. (*Ithaca College*). Major: Education.

Brader, Henry Milton — Kutztown
B.S. (*Muhlenberg College*). Major: Education.

Brown, Charles Ernest — Hellertown
B.S. (*Moravian College*). Major: Education.

Bunger, Reuben Walter — Bethlehem
Ph.B. (*Muhlenberg College*). Major: Education.

Butz, Minerva Elda — Allentown
B.A. (*Cedar Crest College*). Major: Mathematics.

Cann, John Rusweiler — Bethlehem
B.S. (*Moravian College*). Major: Chemistry.
Raybestos-Manhattan Company Research Fellow.

Carwile, Lois Corinne Ketchem — Bethlehem
B.A., B.S., M.S., Ph.D. (*Woman's College, Richmond, Va., University of Virginia*).

Colver, Harry James, Jr. Bethlehem
B.A., B.D. (*Catawba College, Reformed Theological Seminary, Lancaster, Pa.*). Major: History.

Cordero, Victor Pablo Lima, Peru
Ch.E. (*Escuela de Ingenieros*)

Crumley, Lewis William Pueblo, Colo.
B.S. in M.E. (*Colorado University*). Major: Mechanical Eng.

Curley, John Joseph Easton
B.S., M.A. (*Kutztown State Teachers College, New York University*).

Daney, Walter Francis Bethlehem
Ph.B., M.A. (*Muhlenberg College, Lehigh University*). Major: Education.

Davies, Thomas Lloyd Fullerton
B.S. in Ed. (*Kutztown State Teachers College*). Major: Education.

Deifer, Warren Edwin Allentown
B.S. in I.E. (*Lehigh University*). Major: Mechanical Eng.
Instructor in Mechanical Engineering.

Delich, John Paul Palmerton
B.A. (*Lehigh University*).

Delluva, Angeline Marie Bethlehem
B.S. in Ed. (*Muhlenberg College*). Major: Education.

Derr, Elwood LeRoy Allentown
B.S. (*Lebanon Valley College*). Major: Chemistry.

Dickisson, Thomas L. Bethlehem
A.B., B.S. in L.S. (*Moravian College, Drexel Institute*).

Dodd, Gilbert Blake Stroudsburg
B.S. in Ed. (*East Stroudsburg State Teachers College*). Major: Education.

Erdoss, Bela Kalman Easton
Dipl. Ing. (*Royal Joseph University of Engineering*). Major: Mechanical Eng.
Byllesby Fellow in Mechanical Engineering.

Fehnel, Edward Adam Bethlehem
B.S. in Chem. (*Lehigh University*). Major: Chemistry.
Horner Research Fellow

Fenstermaker, Robert Bethlehem
B.S. (*Muhlenberg College*).

Fink, Joseph Michael Ferndale
B.S. (*William and Mary College*). Major: History.

Fink, Paul Jacob Allentown
B.A., M.A. (*Ohio State University*). Major: Education.

Frantz, George Edwin Allentown
B.S. (*Kutztown State Teachers College*). Major: Education.

Frauenfelder, Lewis Jacob Easton
B.S. in Ch.E. (*Lehigh University*).

Frederick, Vivian M. Allentown
B.S. (*Cedar Crest College*). Major: Biology.
Institute of Research Fellowship.

Gilbert, Harry Irman Boyertown
A.B., M.A. (*Pennsylvania State College, University of Pittsburgh*).

Gökcen, Nevzat Altan — Easton
B.S. (*University of Pittsburgh*). Major*: Metallurgy.

Good, Thelma Anna — Bethlehem
B.A. (*Moravian College for Women*).

Goulding, Paul Welling — Nazareth
B.S., M.S. (*West Chester State Teachers College, University of Pennsylvania*). Major: History.

Graham, Mary Cox — Bethlehem
A.B. (*Lake Forest College*)

Gross, John Hammes — Bethlehem
B.S. in Met.E. (*Lehigh University*).
Instructor in Mechanical Engineering.

Haggerty, William Edward — Scranton
B.A. (*University of Scranton*).

Harris, Dale Ackley — Trenton, N. J.
B.A. (*Lehigh University*). Major: Bacteriology.
Swimming Pool Assistant, Katharine Comstock Thorne Fellow.

Heisey, Willis Amos — Denver
B.S. in Chem. (*Albright College*). Major: Chemistry.
Graduate Assistant in Chemistry.

Hemmerly, Ruth Fern — Bethlehem
B.A. (*Moravian College for Women*). Major: English.

Hertz, John Atlee — Bethlehem
A.B. (*Moravian College*) Major: English.

Hightower, Carl Ernest — Allentown
A.B. (*Taylor University*). Major: Education.

Howell, James Levert — Allentown
A.B. (*University of Alabama*). Major: Mathematics.

Illick, Montford Elroy — Hellertown
B.S. (*Lafayette College*).

Jeffrey, Isabel Stuart — Allentown
B.A., B.S. (*Brown University, Simmons College*). Major: Psychology.

Johnson, Margaret Elston — Bethlehem
B.A. (*Moravian College for Women*).

Karas, John Athan — Lebanon
B.S. in Eng.Phys. (*Lehigh University*).
Instructor in Physics.

Kelchner, Mabell — Fleetwood
B.S. (*Albright College*). Major: Education

Keleher, John Joseph — Bethlehem
Ph.B. (*Muhlenberg College*).

Koons, Marion Wright — Bethlehem
B.A. (*Moravian College for Women*).

Kostenbader, Franklyn Eugene — Nazareth
B.S. (*Moravian College*).

Krauss, Mildred Charlotte — Centre Valley
B.S. (*West Chester State Teachers College*). Major: Education.

Kutosh, Stephen — Bethlehem
B.S. in Ch.E. (*Lehigh University*). Major: Chemistry.

Lams, Margaret Miriam — Allentown
B.S. (*Pennsylvania State College*). Major: Chemistry.
Seton Leather Company Fellow.

Levine, William Sirius — Bethlehem
B.A., M.A. (*Ohio State University*). Major*: Chemistry.

Lewis, Samuel — Allentown
C.E. (*Lehigh University*).

Lippa, Shepherd — New York, N. Y.
B.Ch.E. (*College of the City of New York*).

Looker, James Howard — Arlington, Va.
B.S. in Chem. (*Ohio State University*).

Lunt, Sarah Moyer — Easton
Ph.B., A.M. (*Muhlenberg College, New York University*). Major: History.

Mains, Floreine Anderson — Bethlehem
B.F.A. (*University of Colorado*).

Mains, Robert Marvin — Bethlehem
B.S. in C.E., M.S. (*University of Colorado, University of Illinois*). Major*: Civil Engineering.
Assistant Director of Fritz Laboratory.

Mancke, Edgar Bell — Bethlehem
B.S. in Ch.E. (*Lehigh University*).

Marcks, Helen Jane — Allentown
Ph.B. (*Muhlenberg College*). Major: Spanish.

Maxcy, William John — Brooklyn, N. Y.
B.S. in Chem. (*Fordham University*).

McCreedy, Mary — Bethlehem
B.S. (*Muhlenberg College*). Major: Education.

McGeady, Leon Joseph — Freemansburg
B.S. in Met.E. (*Lehigh University*). Major: Metallurgy.

McGuiness, Francis Stevens — Swarthmore
B.S. in M.E. (*Lehigh University*). Major: Mechanical Engineering.
Instructor in Mechanical Engineering.

Miesse, Christian Charles — Bethlehem
A.B. (*Albright College*). Major: Mathematics.

Miller, Margaret Delfreta — Bangor
A.B. (*Ursinus College*). Major: English.

Moser, William Gustave — Nazareth
A.B. (*Muhlenberg College*). Major: Education.

Myers, Richmond Elmore — Emmaus
A.B., M.A. (*Moravian College, University of Pennsylvania*). Major*: Geology.

Nelson, George Douglas — Washington, D. C.
B.S. (*Randolph-Macon College*). Major: Chemistry.
Research Assistant in Chemistry.

Neumoyer, Clifton Rems — Emmaus
B.S. in Ch.E., M.S. (*Lehigh University*). Major*: Chemistry.
Student Chemistry Foundation Fellow.

Nicholson, Bruce Jesmond — Bethlehem
M.E. (*Cornell University*). Major: Mining Engineering.

O'Connell, Francis Peter — Bethlehem
B.Ch.E. (*Villanova College*). Major: Chemical Engineering.

Overfield, Ruth Warg — Bethlehem
B.A. (*Moravian College for Women*)

Packer, George — New York, N. Y.
B.C.E. (*College of the City of New York*). Major: Civil Engineering.
American Institute of Steel Construction Research Fellow.

Parr, Preston, Jr. — Philadelphia
B.S. in Ch.E. (*Lehigh University*).
Raybestos-Manhattan Research Fellow.

Peters, Anne Marie — Bethlehem
A.B. (*College of New Rochelle*). Major: Bacteriology.
Katharine Comstock Thorne Fellow.

Platoff, Zena — Quakertown
B.S. (*Drexel Institute*). Major: Education.

Prieto Isaza, Joaquin Antonio — Bogota, Columbia, S.A.
B.S. in Chem. (*National University of Columbia*). Major: Metallurgical Eng.

Rea, Kathleen — Bethlehem
B.A. (*New Jersey College for Women*). Major: English.

Ressler, Robert Roland — Allentown
B.S. in Chem. (*Lehigh University*). Major: Chemistry.
Raybestos-Manhattan Research Fellow.

Rinker, Robert Rolfe — Bethlehem
B.S., M.A. (*Moravian College, Columbia University*)

Ritter, Ralph Shelly — Allentown
E.E. (*Lehigh University*)

Roberts, Noel Marcus — Allentown
B.B.A. (*Texas Christian University*).

Rogers, Rose Marie — Hontzdale
B.S. in Ed. (*Temple University*).

Saunders, David Robertson — Easton
S.B. (*Harvard College*).

Sawyer, Edwin Albert — Allentown
B.S. in Bus. Adm. (*Lehigh University*). Major: English

Schick, Leonard Hubert — Bethlehem
B.A. (*Lehigh University*). Major: History.

Schlegel, Martha Marie — Allentown
B.A., M.A. (*Moravian College for Women, Lehigh University*). Major*: English.

Schlenker, Herbert John — Kutztown
(*Albright College*). Major: Education.

Seaman, Henry — Hartford, Conn.
B.S., M.S. (*Carnegie Institute of Technology*).

Sellers, Ruth Stackhouse — Rock Hill, S. C.
B.S. (*Winthrop College*).

Shankweiler, Anna Gernert — Allentown
A.B. (*Cedar Crest College*). Major: History.

Shekletski, Adam Edward — Nazareth
B.A. (*Lehigh University*). Major: Education.

Sherry, Robert Seymour — Brighton, Mass.
B.S. in E.E. (*Tufts College*). Major: Electrical Engineering.
Instructor in Electrical Engineering.

Shintaku, Toshiaki — Willow Grove
B.S. in C.E. (*Lehigh University*). Major: Civil Engineering.

Shuhler, Leo Lawrence — East Greenville
B.S. in Ed. (*Kutztown State Teachers College*). Major: Education.

Shunk, Harold Francis — Bethlehem
B.S. (*Lafayette College*). Major: Education.

Silbermann, O. Leon — Bethlehem
B.S. in I.E. (*Lehigh University*). Major: Metallurgy.

St. Clair, William Harold — Baltimore, Md.
B.S. in M.E. (*Lehigh University*). Major: Mechanical Engineering.
Instructor in Mechanical Engineering.

Stein, Oscar Llewellyn — Kutztown
A.B., A.M. (*Franklin and Marshall College, Columbia University*).

Stout, Robert Daniel — Bethlehem
B.S., M.S. (*Pennsylvania State College, Lehigh University*). Major*: Metallurgy.
Instructor in Metallurgical Engineering.

Sturm, Joan — Easton
B.S. (*Cedar Crest College*). Major: Chemistry.

Tor, Sadun Servet — Nazareth
E.M., M.E.M., M.S. (*Colorado School of Mines, Lehigh University*). Major*: Metallurgical Engineering.

Townsend, Robert René — Allentown
B.S. (*Muhlenberg College*). Major: Mathematics.

Vaillant, George Herrera — Havana, Cuba
B.S. (*Havana University*). Major: Electrical Engineering.
Packard Research Fellow in Electrical Engineering.

Walker, William Comstock — Milwaukee, Wis.
B.S. in Ch.E. (*Lehigh University*). Major: Chemistry.
Westvaco Chlorine Products Corporation Fellow.

Weaver, Carlton Samuel — Bethlehem
B.S.M. (*Oberlin College*).

Weaver, Katherine Amelia — Bethlehem
B.A. (*Cedar Crest College*). Major: Education.

Weber, Kurt Heinz — Englewood, N. J.
B.S. in Eng.Phys. (*Lehigh University*). Major: Physics.

Weidner, Camille Ruben — Bethlehem
B.S. (*Muhlenberg College*). Major: Education.

Wernick, Nathaniel Kenneth — Bethlehem
B.M.E. (*College of the City of New York*). Major: Mechanical Eng.
Instructor in Mechanical Engineering.

Wilker, Conrad Robert — Palmerton
B.S. (*Muhlenberg College*). Major: Education.

Williamson, Clyde Patrick — Bethlehem
B.A. (*Lehigh University*).

Witmeyer, John Robert — Bethlehem
B.S. in Ch.E. (*Lehigh University*).

Witmeyer, Marianne Gladys — Bethlehem
B.A., M.A. (*Moravian College for Women, Lehigh University*). Major: Education.

Wolfe, Glenn Edwin — Bethlehem
B.S. in Ed. (*West Chester Teachers College*). Major: Education.

Yao, Yu-lin — Shanghai, China
B.S. in Ch.E., M.Eng., (*National Chekiang University, McGill University*). Major*: Metallurgy.

Yoder, Edgar Donald — Bethlehem
B.S. (*Moravian College*).

Zable, Helen Sydney — Bethlehem
B.S. (*Pennsylvania State College*). Major: Chemistry.
National Oil Products Company Fellow.

UNDERGRADUATE STUDENTS

Arts—Arts and Science
Bus.—Business Administration
Ch.E.—Chemical Engineering
Chem.—Chemistry
C.E.—Civil Engineering
E.E.—Electrical Engineering
E.M.—Mining Engineering
E.P.—Engineering Physics
Engr.—Engineering
G.C.D.—General College Division
I.E.—Industrial Engineering
M.E.—Mechanical Engineering
Met.E.—Metallurgical Engineering

SUMMER SEMESTER 1943, FALL AND SPRING SEMESTERS 1943-44

Abeel, Alan Chichester, Jr.	Ch.E.-Oct.'44	Larchmont, N. Y.
Abell, Ernest George	E.E.-Oct.'44	Philadelphia
Adams, Douglas Strickland	Ch.E.-June '45	Montclair, N. J.
Adler, Alfred Aron	M.E.-Feb.'44	Elkins Park
Albing, Henry William	M.E.-Oct.'45	Buffalo, N. Y.
Allen, Robert Johnson	C.E.-Oct.'46	Maplewood, N. J.
Allman, Elmer Lambert	M.E.-June '46	Bethlehem
Alperin, Irwin Ephraim	M.E.-June '45	Scranton
Alperin, Myer Marvin	Chem.-Oct.'46	Scranton
Altenberger, Russell Albert	Chem.-Oct.'45	Tenafly, N. J.
Amish, Keith Warren	E.E.-Oct.'44	Webster, N. Y.
Anders, Walter Lesesne	Arts-Oct.'43	Bethlehem
Anderson, Harry Wallis, Jr.	Bus.-Oct.'43	Plattsburg, N. Y.
Andrews, John Clenmore	Arts-Oct.'44	Bethlehem
Andrews, Paul Chapman	M.E.-Oct.'44	Trenton, N. J.
Attaway, Fred Jones, Jr.	Ch.E.-Oct.'44	Charleston, S. C.
Austin, Charles Baldrey	Met.E.-Oct.'44	Upper Darby
Bader, John Willard	E.M.-Feb.'45	Rochester, N. Y.
Baer, Eugene Walther III	E.P.-June '45	Bethlehem
Baer, Gordon Reed, Jr.	M.E.-Oct.'45	Johnstown
Baldelli, Essio John	Met.E.-June '45	Lackawanna, N. Y.
Balla, Robert George	M.E.-Feb.'46	Nanticoke
Bannan, Thomas Sheridan	Engr.-June '44	Bethlehem
Bardagjy, Andrew Murad	Bus.-Oct.'43	Jersey City, N. J.
Barnak, Charles Joseph	Ch.E.-Feb.'46	Easton
Barnes, John Alexander	Ch.E.-June '45	Philipsburg
Barnett, Joseph Edgar	Met.E.-Feb.'46	Latrobe
Barron, William Thomas	E.E.-Oct.'45	East Mauch Chunk
Bartholomew, Walter James, Jr.	E.E.-Feb.'46	Allentown
Bartlett, Bertram Francis	Arts-Oct.'45	Bethlehem
Baskin, Curtis Leroy, Jr.	Ch.E.-Oct.'44	Freeland
Bauer, Allison Lee	Arts-Feb.'46	Bethlehem
Bauer, Carl Paul	Ch.E.-June '44	Irvington, N. J.
Baum, John Furley	E.E.-Feb.'46	Niagara Falls, N. Y.
Baumeister, Robert John	M.E.-Oct. '45	Flushing, N. Y.
Bechdolt, William Robert	Met.E.-June '44	Bethlehem
Beck, Robert Edward	M.E.-Feb.'46	Englewood, N. J.
Beck, William Christian III	E.E.-Oct.'44	Washington, D. C.
Bell, Vincent Gruber, Jr.	M.E.-Feb.'46	East Orange. N. J.
Bellis, Max William	E.E.-Feb.'44	Rochester, N. Y.
Bender, Kenneth Francis	M.E.-Feb.'45	Bethlehem
Bennett, Charles Hills	Ch.E.-Feb.'46	Northampton
Bennett, Floyd Mitchell, Jr.	E.P.-Oct.'46	Brooklyn, N. Y.

Bennett, Irving Theodore, Jr.	M.E.-Feb.'46	Baltimore, Md.
Berg, Philip James	M.E.-Oct.'43	Coraopolis
Berman, Frank W.	Met.E.-Oct.'43	Cresskill, N. J.
Berman, Frederic Francis	M.E.-Feb.'45	Cresskill, N. J.
Bernard, William	M.E.-June '45	Summit, N. J.
Bevan, John Richard	Met.E.-June '44	Pottsville
Bick, Maurice	Ch.E.-Feb.'45	Newark, N. J.
Bieret, James Frederick	Arts-Feb.'46	Allentown
Bierman, George William	Met.E.-Oct.'45	Oak Park, Ill.
Billiar, Richard Thomas	Ch.E.-Oct.'45	Rochester, N. Y.
Birnbaum, Ira	M.E.-Feb.'46	New York, N. Y.
Black, John Charles	M.E.-Feb.'44	Allentown
Blanco, Nestor William	Arts-Oct.'45	Lima, Peru, S. America
Blank, Howard Allen	Met.E.-Feb.'45	Bethlehem
Bloecher, Frederick William, Jr.	E.M.-Oct.'44	Kenvil, N. J.
Bloom, George Webster	Arts-Feb.'46	Bethlehem
Blossom, Edward Ludlam, Jr.	E.E.-Oct.'43	Baltimore, Md.
Boll, Richard Henry	Ch.E.-June '44	Wharton, N. J.
Bonin, Joseph Frank	Bus.-Oct.'43	Scranton
Boothby, Willard Sands, Jr.	I.E.-Feb.'46	Philadelphia
Born, Ira Brahm	E.P.-June '44	Bethlehem
Bosserman, Charles Emmett, Jr.	I.E.-June '44	Newport
Boyd, Hugh III	M.E.-June '44	Doylestown
Bradford, Warren Henry	Ch.E.-June '44	Mansfield, Ohio
Bradshaw, Richard Warren	M.E.-Oct.'44	Wilmington, Del.
Breidinger, William Charles	Ch.E.-Oct.'44	Nazareth
Brobst, Donald Albert	Arts (Spl.)	Allentown
Brody, Herbert Irving	Ch.E.-Feb.'46	Pittsburgh
Brody, Sidney Jerome	Bus.-Feb.'46	Pittsburgh
Brossman, Martin Werner	M.E.-Feb.'45	Allentown
Brower, George Harvey	E.P.-Feb.'44	Allentown
Brown, Edward John	Arts (Spl.)	Allentown
Brown, George Hafner	Engr.-June '44	Bethlehem
Browning, Samuel Richard	E.E.-June '46	Essex Fells, N. J.
Browning, Walter Pharo	E.E.-Feb.'46	Devon
Buckner, George II	Bus.-Oct.'43	Bethlehem
Buczynski, Joseph John, Jr.	Met.E.-Oct.'43	Exeter
Buehler, Paul Robert	E.E.-June '45	Allentown
Bugbee, Alvin Newton, Jr.	C.E.-June '44	Catasauqua
Busch, Harry Fort	E.E.-Oct.'44	Wyomissing
Cahoon, Robert Leslie	Met.E.-Oct.'43	Norway, Me.
Callen, Alfred Copeland, Jr.	Met.E.-June '44	Bethlehem
Camarda, Frank Vincent John	Ch.E.-Oct.'43	Plainfield, N. J.
Campbell, Douglas Young	Arts-June '45	Rutherford, N. J.
Cantera, Carl Anthony	C.E.-Feb.'46	Wilmington, Del.
Cantwell, Garrett Wright	Ch.E.-June '45	Tulsa, Okla.
Carr, Francis Thomas	Ch.E.-Oct.'44	Pottsville
Carroll, John Millar	Ch.E.-Feb.'46	Farmingdale, N. Y.
Castiello, Richard Edward	M.E.-June '44	Bethlehem
Cavanagh, William Edward, Jr.	Met.E.-Oct.'43	Newark, N. J.
Cawley, Robert Williamson	M.E.-June '44	Upper Montclair, N. J.
Charest, Charles Norman	E.M.-Feb.'44	Hazleton
Christ, Frederick Karl	Ch.E.-Oct.'44	Union, N. J.
Ciaffardini, Aldo Nicholas	E.P.-Feb.'44	Bethlehem
Clark, John Andrew, Jr.	Ch.E.-Feb.'46	Harrisburg
Clemmer, Joel Gerhard, Jr.	Bus.-Oct.'43	Glenside

Cliff, Thomas Edward	Arts-Oct.'46	Coopersburg
Cohen, Arnold Marvin	I.E.-Oct.'46	Camden, N. J.
Cohen, Leslie	E.E.-Oct.'45	Ayrshire, Scotland
Cohen, Nathan	Ch.E.-Feb.'46	Bethlehem
Coles, Dudley	C.E.-Oct.'43	Newark, N. J.
Collins, Carter Compton	Ch.E.-Oct.'46	Crockett, Cal.
Collins, Robert William	Bus.-Oct.'46	Hollis, N. Y.
Collmann, Irving Reid	Arts-Feb.'44	Wilkes-Barre
Conahan, Hugh Alyosius, Jr.	Ch.E.-Oct.'45	Bethlehem
Conklin, Charles Russell, Jr.	Ch.E.-Oct.'43	Catonsville, Md.
Connolly, Thomas Robert	C.E.-Feb.'46	Woodbridge, N. J.
Cooper, Ronald Loyal	Engr.-June '44	New York, N. Y.
Cordrey, James Milbourne	Ch.E.-Feb.'44	Salisbury, Md.
Cornelius, Alfred Joseph	Bus.-Feb.'44	New Rochelle, N. Y.
Corsa, Pinckney Morrison	M.E.-June '44	Philadelphia
Corwin, Henry Hobart	Bus.-Feb.'44	New London, Conn.
Cotter, Donald Raymond	G.C.D.	Lansdale
Courtney, Howard Wright, Jr.	Engr.-June '44	Westfield, N. J.
Coutts, Robert Lloyd, Jr.	Bus.-Oct.'43	Morristown, N. J.
Cox, David Frederick	E.P.-Oct.'43	Cleveland Heights,Ohio
Craig, Richard Axtell	E.P.-Feb.'46	Maplewood, N. J.
Cramer, Granville Robert	M.E.-Feb.'46	Morris Plains, N. J.
Cristy, Albert Bowman	M.E.-June '46	Honolulu, T.H.
Croake, Thomas James	E.E.-June '44	South Orange, N. J.
Cumming, Edward Knapp, Jr.	M.E.-Feb.'45	Union, N. J.
Cummings, David Triplett	M.E.-Oct.'45	Beacon, N. Y.
Cummings, Edwin Huley	M.E.-Oct.'44	Philadelphia
Curtis, Robert Bartlett	E.P.-June '45	Bethlehem
Curtiss, Donald Nathaniel	M.E.-June '44	Clifton, N. J.
Danes, Edward Nelson	Chem.-June '46	Rockville Center, N. Y.
Dart, Robert Stanford	E.E.-June '45	Glen Ridge, N. J.
Dashe, John	G.C.D.	West Easton
Dashifsky, William	E.P.-Oct.'46	St. Clair
Davidson, Robert Oliver	M.E.-June '46	Brockton
Davies, David Kaufman	M.E.-June '45	Scranton
Davies, Richard Thomas	M.E.-Oct.'45	Catasauqua
Davis, John Alexander	Met.E.-Oct.'44	Glassport
Day, William James	Bus.-June '45	South Orange, N. J.
Deach, John Joseph, Jr.	E.E.-Feb.'44	Pottsville
Deal, Edward Leon	M.E.-June '45	White Haven
DeCowsky, George Nestor	E.E.-Oct.'44	Pennsburg
Deffaa, Louis Philip	M.E.-Feb.'45	Larchmont, N. Y.
Delich, John Paul	Arts-Feb.'44	Palmerton
DelVecchio, Leonard Matthew	Arts-June '45	Freeland
Dempsey, William Henry	Ch.E.-June '46	South Orange, N. J.
Derewianka, Nicholas	E.E.-June '45	Chester
DeTurk, Richard Snyder	Engr.-Feb.'46	Garden City, N. Y.
Devitt, John Edmund	Bus.-Oct.'43	Mountain Top
DeWan, Charles Joseph	Arts-June '44	Sayre
DeWitt, Maynard Browning	Arts-Feb.'46	Washington, D. C.
Dicke, Allen August, Jr.	M.E.-June '45	Upper Montclair, N. J.
Diefenderfer, Carson Freyman	C.E.-June '44	Fullerton
Diehl, Edward Lewis	C.E.-June '44	York
Dieter, Robert Frederick	Ch.E.-Oct.'43	Port Washington, N. Y.
Dinon, Alfred John	E.E.-Feb.'46	Upper Darby
Dintenfass, Maurice Allen	Arts-Feb.'46	Newark, N. J.

DiSpirito, Vincent J.	C.E.-Oct.'46	Freeland
Dittig, Roger George, Jr.	C.E.-Oct.'44	Port Washington, N.Y.
Dix, Warren Richard	Met.E.-Feb.'44	Little Falls, N. J.
Domeratzky, Louis Martin	M.E.-Oct.'44	McLean, Va.
Donaghy, Harry Winthrop, Jr.	Ch.E.-June '46	Wynnewood
Donahue, John Francis	Met.E.-Feb.'44	Garden City, N. Y.
Donahue, Joseph Andrew	I.E.-Oct.'45	Garden City, N. Y.
Doster, John Christian	M.E.-June '45	Bethlehem
Downes, Russell Conwell	Ch.E.-June '45	Lynbrook, N. Y.
Downing, Richard Irvine	I.E.-June '46	Ellwood City
Downs, Charles Lehman, Jr.	E.E.-June '46	Jackson, Miss.
Downs, James Douglas	Arts-Feb.'46	Allentown
Doxsey, John Evans	M.E.-Feb.'44	Shaker Heights, Ohio
Durich, Louis John	G.C.D.	Bethlehem
DuBois, Guy Jacques	Ch.E.-Feb.'46	Kennett Square
Egan, Bernard John	Met.E.-Oct.'43	Emporium
Eisenberg, Norman Albert	Ch.E.-Feb.'46	East Orange, N. J.
Eisenhard, Stanley Edward, Jr.	E.E.-June '45	Allentown
Eliezer, David Frank	E.E.-Feb.'46	Paterson, N. J.
Elliott, Eugene Grant	G.C.D.	Bethlehem
Ellowitz, Howard Irwin	Chem.-Feb.'46	Scranton
Ellsworth, Stuart Marsh, Jr.	Arts-Oct.'43	Central Village, Conn.
Elm, Gerhard William	Ch.E.-Oct.'45	Palmerton
Ely, Allen Judson, Jr.	M.E.-June '45	Roselle, N. J.
Emrey, Richard Clay	M.E.-June '46	Bethlehem
Epstein, Arnold Samuel	E.E.-June '44	Bethlehem
Epstein, Danal Paul	Bus.-Oct.'43	New York, N. Y.
Ernest, William Allen	E.E.-June '44	East Orange, N. J.
Ershler, Stanley Robert	Ch.E.-Feb.'46	Allentown
Ettinger, Jacob Milton	I.E.-June '44	Norristown
Evans, Ralph Aiken	E.P.-June '44	East Orange, N. J.
Evans, Richard Arthur	Ch.E.-Feb.'46	Brooklyn, N. Y.
Facchiano, Peter Pasquale	C.E.-Feb.'45	Bethlehem
Fair, Robert James Andrew, Jr.	Bus.-Oct.'46	Pittsburgh
Farrel, William Bartholomew	Engr.-June '44	Great Neck, N. Y.
Fatzinger, Frank Alexander	Ch.E.-Oct.'45	Catasauqua
Feigley, Donald Malcolm	Arts-Feb.'44	Quakertown
Ferdinand, Albert Guy	Arts-Oct.'43	Freeland
Ferrell, Blaine Donald	Ch.E.-Feb.'44	Roslyn
Fetter, Edmond Crawford, Jr.	Met.E.-June '44	Media
Fischer, Donald David	M.E.-June '45	Paterson, N. J.
Fish, James Temple	G.C.D.	Easton
Fitch, Jack Clifford	Ch.E.-Feb.'44	Scranton
Forner, Raymond Albert	Ch.E.-June '44	Catasauqua
Forshay, Richard Hoyt	M.E.-Feb.'46	Hempstead, N. Y.
Forsythe, Marvin Perry	E.E.-Oct.'45	Kenvil, N. J.
Fortosis, Anthony Constantine	Bus.-Oct.'44	Bethlehem
Fox, Oscar Edwin, Jr.	I.E.-June '44	Reading
Fox, Victor Warren	Ch.E.-Feb.'45	Asbury Park, N. J.
Frankley, Edgar Allan	E.E.-Oct.'44	Forest Hills, N. Y.
Franklin, Donald Richard Lee	Bus.-June '45	New York, N. Y.
Franz, Paul Justus, Jr.	Bus.-Oct.'44	Elkins Park
Frey, Hugh Bartley, Jr.	E.E.-Oct.'43	Dunellen, N. J.
Frey, Robert Godfrey Widmer	C.E.-Oct.'44	Allentown
Friend, Richard Albert	Ch.E.-June '44	Elmira, N. Y.
Fritz, Carl George	Ch.E.-Oct.'45	Poughkeepsie, N. Y.

Frost, Edward Lyster	Met.E.-Oct.'43	Kenmore, N. Y.
Fuller, Harold Bentley	M.E.-June '46	Norwich, N. Y.
Funk, Roger Smith	M.E.-June '45	Hagerstown, Md.
Furstman, William Barnett	M.E.-June '45	Dover, N. J.
Gahagan, Philip James	Arts-Feb.'44	Bethlehem
Gates, Milbourne Thornton	M.E.-Feb.'46	Woodbury, N. J.
Gawthrop, George, Jr.	Ch.E.-Feb.'44	Philadelphia
Gearhart, David Franklin	Arts & Engr., Feb.'44	Palmerton
Gebhard, John Charles, Jr.	Ch.E.-Feb.'46	Pensacola, Fla.
Gehr, John Edwin	Engr.-June '44	Binghamton, N. Y.
Gentilesco, Frank Alfonse	E.E.-Oct.'45	New Haven, Conn.
Gerb, David Martin	Arts-Feb.'46	Somerville, N. J.
Gerhart, Richard Lee	C.E.-Feb.'44	Ephrata
Gerlach, Ernest Richard	Ch.E.-Oct.'44	Bethlehem
Gilbert, Gerald Frederick, Jr.	Ch.E.-Oct.'46	West Reading
Giles, Charles Kenneth	Ch.E.-Oct.'44	Lowell, Mass.
Gill, James Powell, Jr.	Met.E.-Feb.'46	Latrobe
Gill, Robert Joseph	Ch.E.-June '44	Philadelphia
Gilmore, Robert Dale	Arts-Oct.'43	Harrisburg
Gilroy, William Francis	G.C.D.	Bayside, N. Y.
Glaser, Paul Stefan	Ch.E.-Feb.'45	New York, N. Y.
Glatzer, Seymour	Arts-June '46	Jamaica, N. Y.
Gluck, Michael John	Ch.E.-Oct.'44	New York, N. Y.
Gockley, Gene Hewitt	M.E.-Oct.'44	Allentown
Godschall, William Harrison	Arts-June '46	Philadelphia
Golden, James Eagen	E.M.-Oct.'44	West Pittston
Goodale, John Henry	Ch.E.-Oct.'44	Louisville, Ky.
Goodhart, Jay Hughes	E.M.-Feb.'46	Irwin
Goodman, Allen Jay	Arts-June '46	New York, N. Y.
Goodman, Murray Henry	Arts & Engr. Feb.'46	Bethlehem
Gottschall, Richard Carl	Engr.-Oct '44	Baltimore, Md.
Graber, Ralph Schultz	Arts-Feb.'46	East Greenville
Green, David Wagener	E.E.-Feb.'44	Easton
Greenbaum, Lee Alfred, Jr.	Chem.-June '44	New York, N. Y.
Greene, Richard Frank	E.P.-Feb.'46	Brooklyn, N. Y.
Greening, Edward Francis	Ch.E.-June '45	Brooklyn, N. Y.
Grell, Harry William, Jr.	M.E.-Oct.'45	Brooklyn, N. Y.
Gretz, John Louis	Met.E.-Oct.'43	Wayne
Griffis, Jack Edward	E.E.-Oct.'44	Bethlehem
Griffith, John W.	M.E.-June '46	Scranton
Griffith, William Robert	Arts-Oct.'44	Bethlehem
Grim, John Calvin	Bus.-June '45	Topton
Gross, Henry Edward	I.E.-Feb.'46	Elkins Park
Gross, John Hammes	Met.E.-Feb.'44	Bethlehem
Gross, Robert Felix	Arts-June '45	Telford
Grubmeyer, Charles Foley Stewart	M.E.-Feb.'46	Harrisburg
Gruenwald, Fred	Ch.E.-Oct.'43	New York, N. Y.
Gsell, Ernest John	Arts-Oct.'43	East Orange, N. J.
Gumpert, Hibbard Gustave, Jr.	Arts-Feb.'44	Sharon Hill
Hafner, Charles Gilbert	Arts-Oct.'45	Bethlehem
Hafner, Claude Joseph	Engr.-Oct.'44	Bethlehem
Haldeman, John Stanley	E.E.-June '45	Doylestown
Hall, Herbert William, Jr.	C.E.-Feb.'46	Hempstead, N. Y.
Hall, Richard Jacobs	E.E.-Feb.'46	Garden City, N. Y.

Hamme, Donald Eugene	E.E.-June '45	Hanover
Handwerk, Eugene Joseph	E.E.-Feb.'46	Allentown
Handwerk, Glenn Erwin	Ch.E.-June '45	Lehighton
Hanley, John Edmond	Ch.E.-Feb.'46	Brooklyn, N. Y.
Harman, Henry Martyn, Jr.	Bus.-Feb.'46	Wynnewood
Harnish, Harry Gerald	M.E.-June '45	Willow Street
Harriger, Clarence Monroe, Jr.	Ch.E.-Oct.'44	Beaverdale
Harris, John Arthur Ernest	Arts-Oct.'46	Wayne
Haubenstock, Alan Sidney	M.E.-Feb.'46	Paterson, N. J.
Hausman, Newton Barrett	Bus.-Feb.'46	Irvington, N. J.
Haviland, Barry	Engr.-Feb.'46	Maplewood, N. J.
Hebrank, William Howard	M.E.-Oct.'43	Baltimore, Md.
Heck, George Walley, Jr.	Met.E.-Oct.'44	Bethlehem
Heck, Theodore Guy	Engr.-June '44	Bethlehem
Heil, Sterling Henry	G.C.D.	Easton
Heinz, John Frank	M.E.-June '45	Allentown
Heironimus, Robert Allen	M.E.-Oct.'43	Maplewood, N. J.
Helstrom, Carl Wilhelm	E.P.-June '45	Easton
Hendrick, Richard Baldwin	Met.E.-Oct.'43	East Orange, N. J.
Hendrickson, Frank Caldwell, Jr.	M.E.-Feb.'45	Valley Stream, N. Y.
Henry, John Howard	I.E.-June '44	East Orange, N. J.
Herman, Henry Russell	M.E.-Oct.'46	Nanticoke
Herron, Carl Jacob	E.E.-Oct.'46	Pittston
Hess, Frederick George	E.M.-June '44	Bellmawr, N. J.
Hess, Richard Garber	M.E.-Feb.'46	Lititz
Hetherington, Alexander Charles	Ch.E.-Feb.'44	Union, N. J.
Hewit, Oliver Hartley III	M.E.-Feb.'46	Plainfield, N. J.
Hicks, Donald Gilbert	I.E.-Feb.'46	Baltimore, Md.
Hicks, Robert Carl	Ch.E.-Feb.'46	Upper Darby
Hicks, Robert Holliday, Jr.	M.E.-Feb.'44	Baltimore, Md.
Highfield, William Henry	Ch.E.-Oct. '44	Bethlehem
Hill, Frank Avery	E.E.-June '44	Easton
Hill, Lewis Warner	M.E.-Feb.'44	Bethlehem
Hilton, Charles Carlson	Met.E.-Oct. '43	Hamilton, Ont., Canada
Hittinger, William Charles	Met.E.-Feb.'44	Bethlehem
Hoagland, Ira Elston	Ch.E.-Feb.'46	Hackettstown, N. J.
Hoffman, Clair Adam	Ch.E.-June '44	Palmerton
Horlacher, Richard Dannecker	C.E.-June '44	Allentown
Hosford, James Allison	M.E.-Feb.'44	Maplewood, N. J.
Hoyt, Leon Glover, Jr.	Ch.E.-Feb.'46	Summit, N. J.
Hursh, William Boyd	Met.E.-June '44	Bethlehem
Hutchinson, Andrew James	Ch.E.-Feb.'46	Bethlehem
Huyett, Richard Caldwell	M.E.-June '46	Birdsboro
Huyett, William Irvin	E.E.-Feb.'46	Wyomissing
Iacocca, Lido Anthony	I.E.-June '45	Allentown
Inderrieden, Alfred John, Jr.	Ch.E.-June '44	Tulsa, Okla.
Ingemanson, Carl Richard	E.E.-June '44	Succasunna, N. J.
Ingersoll, John Heberton	M.E.-Feb.'46	Wayne
Inglese, Louis	M.E.-Oct.'44	Allentown
Jacoby, Robert Harold	Ch.E.-Oct.'44	Camden, N. J.
Jaslow, Robert Irwin	Arts-Oct.'43	Reading
Jeffries, Norman Lake, Jr.	M.E.-Oct.'46	Port Norris, N. J.
Jelly, Irving Augustus	C.E.-Feb.'46	Palmerton
Jensen, Robert Otto	Arts-June '44	Freeport, N. Y.
Johns, Walter Scott III	C.E.-Feb.'46	Evanston, Ill.
Johnson, Ralph Richard	Ch.E.-Oct.'44	Easton

Jones, Charles Dingee	M.E.-June '45	Philadelphia
Jones, Owen John, Jr.	Ch.E.-June '46	Dauphin
Jones, Robert Edgar	M.E.-Oct.'45	East Williston, N. Y.
Jordan, Russell Cornelius	M.E.-Feb.'44	Hasbrouck Hts., N. J.
Judis, Lowell Hollander	Bus.-Oct.'45	New Rochelle, N. Y.
Kachurin, Leon Edward	Arts-Feb.'46	New York, N. Y.
Kaercher, Charles Frederic III	M.E.-June '46	Philadelphia
Kahler, George Whitesell, Jr.	E.E-June '45	Nazareth
Kane, Bernard	E.E.-Feb.'46	New York, N. Y.
Kangis, John Harry	Bus.-Feb.'46	Lynn, Mass.
Kaplan, Martin Jerome	Ch.E.-Oct.'44	Allentown
Kareha, Joseph Edwin	Ch.E.-Oct.'43	Peckville
Karlik, Robert John	E.E.-Oct.'46	Hazleton
Karnofsky, Robert Earl	Arts-June '46	Wilkes-Barre
Kassabian, Richard Peter	Chem.-Oct.'44	Fairview, N. J.
Keen, C. Merris, Jr.	Arts-Oct.'46	Salem, N. J.
Keese, David Leslie	I.E.June '44	Scranton
Kehrli, Henry Stewart	M.E.-Feb.'46	Scranton
Keller, Charles Stauffer	M.E.-Feb.'46	Reading
Keller, Richard William	Ch.E.-Feb.'46	Detroit, Mich.
Kendziora, Carl August, Jr.	Engr.-June '44	Harrison, N. Y.
Kennedy, John Marius	E.E.-Feb.'44	New York, N. Y.
Kennedy, Julian III	E.M.-Oct.'44	Sewickley
Kern, Frederick Reginald	Ch.E.-Feb.'46	Ridgefield, N. J.
Kern, Harry Burgess	Arts-June '45	Catawissa
Kestenbaum, Aaron L.	E.P.-June '45	Plainfield, N. J.
King, William Jack	Ch.E.-June '45	Peckville
Kirk, David Clark, Jr.	Ch.E.-Oct.'44	Kearny, N. J.
Kirkham, William Lowndes	M.E.-June '45	Fairlawn, N. J.
Kitson, Peter James	E.E.-Oct.'45	Westfield, N. J.
Kleckner, James Franklin	Arts-Oct.'44	Gary, Ind.
Klepper, Nicholas Erwin	E.E.-Oct.'46	Forest Hills, N. Y.
Kleppinger, Carl Theodore	Chem.-Feb.'44	Allentown
Kluck, Walter	Ch.E.-Oct.'45	Clifton, N. J.
Knoll, Kenneth Robert	Engr.-June '44	Crestwood, N. Y.
Kocher, Frederick William	Ch.E.-Feb.'46	Allentown
Kocyan, George Henry, Jr.	M.E.-Feb.'44	Kingston
Konapelsky, Paul Michael	M.E.-Oct.'46	Cementon
Korkegi, Robert Hani	M.E.-Feb.'46	Jackson Hts., N. Y.
Kovach, Joseph, Jr.	Bus.-Oct.'45	Bethlehem
Kraemer, William Charles	Ch.E.-Feb.'46	Roselle, N. J.
Kramer, John Haines	Bus.-June '46	Allentown
Kramlich, Richard Giehl	M.E.-June '46	Allentown
Kratzer, John Lewis Edward	E.E.-Feb.'44	Wescosville
Kronthal, William Louis	Bus.Oct.'43	New York, N. Y.
Kunkel, Paul Francis	M.E.-Oct.'46	Kutztown
Kunsman, Gene Erwin	Met.E.-Feb.'46	Bethlehem
Kurtz, Claude Jennings	Ch.E.-Oct.'43	Berwick
Kurtz, Joseph James	Chem.-Oct.'43	Northampton
*Kush, Mary Frances	Arts	Allentown
Kutosh, Stephen	Ch.E.-Oct.'43	Bethlehem
Kynor, Herbert Dailey, Jr.	M.E.-Feb.'46	Hazleton
Laird, Samuel Wilson, Jr.	Bus.-Feb.'46	Rumson, N. J.
Lally, John Francis	Arts-June '45	Bethlehem
Land, Alfred Joseph	I.E.-Oct.'46	Brooklyn, N. Y.
Landau, William Morris	Bus.-Oct.'46	Mt. Vernon, N. Y.

Landstreet, Fairfax Stuart	Ch.E.-June '45	Fairfax Ct. House, Va.
Landy, Robert Jay	E.E.-Oct.'46	Mt. Vernon, N. Y.
Lang, Donald Headdon	M.E.-June '46	Jamaica, N. Y.
Lau, Ralph Rupp	E.E.-Feb.'44	Harrisburg
Laurencot, René Edward	C.E.-Feb.'45	Brooklyn, N. Y.
Lauten, Franklin Joseph	Ch.E.-June '45	Ridgewood, N. J.
Lauterbach, Herbert George	Ch.E.-June '44	New York, N. Y.
Lawrence, James Bruce	Arts-Feb.'46	Bethlehem
Lebovitz, Philip Henry	M.E.-June 45	Baltimore, Md.
Lee, Jay Richard	Chem.-June '44	Bethlehem
Lee, Kam Fong	Met.E.-June '44	Canton, China
Leeds, Richard Henry	Bus.-June '44	New York, N. Y.
Lehr, Harold Diefenderfer, Jr.	M.E.-Feb.'46	Elkins Park
Leiter, Richard Maxwell	Arts-June '44	Hagerstown, Md.
Leitner, Frank Nicholas	Engr.-June '44	Maplewood, N. J.
Lentz, Frederick Robert	E.E.-Feb.'46	Allentown
Lerner, Myron Aaron	Bus.-June '44	Allentown
Leroux, André Jean Emile	Arts-Feb.'44	Philadelphia
Leschak, Kuzma, Jr.	E.E.-June '45	Jermyn
Levin, Robert Barney	Arts-Oct.'45	Trenton, N. J.
Levy, Daniel Steven	M.E.-Oct.'45	Minneapolis, Minn.
Lewis, Thomas Edward	Ch.E.-June '46	Pocono Pines
Leyland, Gordon Buckley	M.E.-Feb.'46	Bloomfield, N. J.
Lindholm, Cornelius, Jr.	C.E.-June '45	Teaneck, N. J.
Lindner, Charles Benjamin	I.E.-June '46	Larchmont, N. Y.
Lindner, Norman Julian	M.E.-June '44	Jersey City, N. J.
Link, Roderick Wylie	M.E.-June '44	Glen Rock, N. J.
Litrides, Stephen James	E.E.-Oct.'44	Springfield, Mass.
Little, Leslie Ralph, Jr.	Ch.E.-Oct.'44	New Brighton
Loch, Luther Daniel	Ch.E.-Oct.'44	Allentown
Logan, Robert Westfall	Ch.E.-Oct.'44	Coatesville
Long, Lawrence Hampton	M.E.-Feb.'45	Brooklyn, N. Y.
Long, Robert Martin	Met.E.-Oct.'43	Bethlehem
Lorimer, Donald McFaul	Met.E.-Oct.'43	Douglaston, N. Y.
Lotz, John Jacob	C.E.-Feb.'45	Philadelphia
Lowry, Donald Randolph, Jr.	M.E.-Feb.'44	Great Neck, N. Y.
Luckenbach, Edward Cooper	Ch.E.-Feb.'46	Bethlehem
Lynn, Harry Wasdell, Jr.	Engr.-June '44	Floral Park, N. Y.
Lyon, Clarence Sharp	E.E.-Feb.'46	Wormleysburg
Lytle, Creighton Lamar	Arts-Feb.'44	Minersville
Maack, Herbert Raymond	Ch.E.-Feb.'46	Pottstown
MacAdams, Richard Joseph	M.E.-June '46	Allentown
MacMillan, John Harper	M.E.-Feb.'46	Vineland, N. J.
Majczan, Frank Louis	Bus.-Oct.'44	Bethlehem
Malles, Louis William	M.E.-Feb.'46	Bethlehem
Manning, Edward George	E.E.-June '45	Buffalo, N. Y.
Maragakes, Christopher	Ch.E.-June '45	Astoria, N. Y.
Margie, Walter Edward II	Ch.E.-Oct.'44	West Pittston
Marsden, Phillips Brooks, Jr.	Engr.-Oct.'44	Maplewood, N. J.
Marsh, Frank H., Jr.	M.E.-June '45	Allentown
Marsh, James Sutherland	M.E.June '44	Washington, D. C.
Martin, William Christopher	Met.E.-Feb.'46	Elkins Park
Marx, Edwin Philipp	Ch.E.-June '44	River Edge, N. J.
Mathes, Robert Harris	E.E.-Feb.'44	Maplewood, N. J.
Matysek, William Joseph	Arts-Oct.'45	Newark, N. J.
Mayer, Robert Walter	Ch.E.-June '45	Reading

Mazur, Lester David	Engr.-Oct.'44	White Plains, N. Y.
McCarthy, Daniel Laurence, Jr.	G.C.D.	Bethlehem
McElroy, Stephen Bowne	Bus.-June '44	Westfield, N. J.
McGrath, Frank Joseph	Ch.E.-Oct.'44	Yonkers, N. Y.
McKay, Ronald Gilmore	Ch.E.-June '45	Garden City, N. Y.
McKnight, George William	M.E.-Feb.'44	Freemansburg
Megas, Theodore George	Met.E.-Feb.'44	Kearny, N. J.
Melloy, George Florian	Met.E.-Oct.'44	Bethlehem
Mengel, John Franklin	M.E.-June '44	Bethlehem
Messinger, Claude Orison	I.E.-June '44	Bethlehem
Metcalf, Albert Traver, Jr.	E.E.-Oct.'46	Pottstown
Metten, William Fowler, Jr.	Bus.-Oct.'43	Wilmington, Del.
Meyer, George Wallace	Engr.-June '45	Garden City, N. Y.
Michel, Burton David	M.E.-Feb.'46	New Haven, Conn.
Mikisits, Frank	Arts-Spl.	Nazareth
Miksitz, Frank J.	G.C.D.	Coplay
Miles, Rowland Barton	Ch.E.-June '45	Northport, N. Y.
Miller, Arthur Gene	E.E.-Oct.'46	Mount Vernon, N. Y.
Miller, Charles Earl	Arts-Feb.'44	Bethlehem
Miller, Jack Leslie	Engr.-June'44	Clifton, N. J.
Miller, Walter Ernest	Ch.E.-Oct.'44	Elizabeth, N. J.
Mills, Courter Dickinson	Arts-Oct.'43	New Castle
Miltenberger, Robert Stanley	Met.E.-Feb.'44	Easton
Miskinis, Kay Felix	E.E.-Oct.'43	Easton
Mitchell, Andrew III	Ch.E.-Oct.'43	Philadelphia
Mitchell, Charles Gray	M.E.-Oct.'46	Brooklyn, N. Y.
Mizel, Bernard Jackson	M.E.-Oct.'44	Kingston, N. Y.
Moore, Charles Frederick	M.E.-June '44	Claymont, Del.
Moore, John Harlan	M.E.-Feb.'45	Pittsburgh
Moore, William Robert	I.E.-Feb.'45	Jenkintown
Morrison, Marcy Lee	M.E.-June'44	Buffalo, N. Y.
Moses, Willis Sumner	C.E.-Feb.'46	Edgewater Park, N. J.
Mosier, Laurence Austin	Arts-Oct.'43	Chevy Chase, Md.
Moss, Robert	M.E.-Feb.'44	Brooklyn, N. Y.
Mountsier, John Stevenson	M.E.-June '46	Nutley, N. J.
Moyer, Dean La Roche	Arts-Oct.'45	Macungie
Mueller, Donald Elmer	M.E.-Feb.'46	Garden City, N. Y.
Muhleisen, Edward Herman	Ch.E.-Oct.'44	Philadelphia
Mulherin, Joseph Harold	Met.E.-Oct.'45	Scranton
Muller, Herbert Matthew	Ch.E.-June '44	Buffalo, N. Y.
Munford, John Robert	Arts-Feb.'44	Hartford, Conn.
Murray, Glenn Allan	M.E.-Feb.'44	Larchmont, N. Y.
Murray, Willard Augustus	M.E.-June '45	Wyomissing
Myers, Joseph Hooker	Arts-Oct.'44	Kingston
Nace, Donald Miller	Ch.E.-June '45	Hanover
Nash, Claude Walter	Ch.E.-Feb.'46	Jackson Heights, N. Y.
Naylor, Calvin Edward	Ch.E.-Oct.'46	Duryea
Neal, Russell Elwood	C.E.-June '45	Bethlehem
Neandross, Leif Hubert	Ch.E.-Feb.'46	Ridgefield, N. J.
Neimeyer, Henry Isaac	Bus.-Oct.'45	Emmaus
Nelson, Russell Charles	Met.E.-Feb.'46	Bogota, N. J.
Neureuter, Howard Raymond	Engr.-June '44	Eggertsville, N. Y.
Nicholasen, Paul Frederick	Ch.E.-June '45	Nazareth
Niewenhous, Theodore Hyatt	Arts-Oct.'45	Arlington, Va.
Nikles, Otto John	M.E.-Oct.'45	Allentown
Nippert, Charles Raymond	M.E.-Oct.'46	Allentown

O'Brien, Joseph Francis	Arts & Engr. Feb.'44	Lebanon, N. J.
Odrzwolski, Stanley W.	E.E.-Oct.'44	Buffalo, N. Y.
O'Neill, Frank Robert	M.E.-June '44	Drexel Hill
Ost, Henry Christian, Jr.	Bus.-Feb.'44	Pottsville
Ottens, Robert Constantine	E.E.-Oct.'43	Allentown
Otto, Theodore Charles	M.E.-Feb.'46	Rutherford, N. J.
Paddock, Robert Martin	Bus.-Oct.'43	Wolcott, N. Y.
Page, Lewis Franklin	E.E.-Feb.'44	Pelham, N. Y.
Palmer, John Courtland	M.E.-Oct.'45	Cresco
Pappas, Michael James	Bus.-June '44	Elizabeth, N. J.
Pearson, William Cecil	Bus.-Feb.'44	Bethlehem
Pecsek, Joseph	E.E.-Feb.'46	Bethlehem
Penniman, Richard Edgar	Engr.-June '44	Bethlehem
Perez, Eduardo Antonio	G.C.D.	Maracaibo, Venezuela
Perley, Albert Slocomb	M.E.-Oct.'44	Black Mountain, N. C.
Perry, David De Wolf	E.P.-Oct.'45	Philadelphia
Peters, Theodore, Jr.	Ch.E.-Oct.'43	Chambersburg
*Petersen, Miriam Barnard	Arts	Bethlehem
Pettit, William Dunlap	Bus.-Oct.'45	Pittsburgh
Pfisterer, Robert John	Met.E.-Oct.'43	Dunkirk, N. Y.
Pharo, John William	E.E.-Oct.'44	Bethlehem
Phillips, Howard Watson, Jr.	I.E.-Oct.'46	Chevy Chase, Md.
Piazza, Joseph Leonard	E.E.-Feb.'45	Great Neck, N. Y.
Pierok, Walter Alexander	Arts-June '46	Bethlehem
Pieski, Edwin Thomas	Chem.-June'45	Dickson City
Pin, Aldo Joseph John	Chem.-June '45	Pen Argyl
Pineda, Victor Manuel	E.E.-Oct.'45	Maracaibo, Venezuela
Pines, Seemon Hayden	Ch.E.-June '45	Pottsville
Poland, William Babcock, Jr.	E.E.-June '46	Washington, D. C.
Ponisi, Harry Paul	Ch.E.-June '44	Somerville, N. J.
Porraro, Pellegrino Patsy	Engr.-Feb.'46	Glen Rock, N. J.
Potter, Georges Richard	E.E.-June '44	Larchmont, N. Y.
Potts, Douglas Long	Arts-Feb.'46	Cressona
Pozebanchuk, Eugene	M.E.-June '46	Allentown
Prentzel, Howard Moore	Arts-Oct.'45	Garden City, N. Y.
Probst, John Stanley, Jr.	E.E.-Oct.'46	East Aurora, N. Y.
Protter, Eric	Ch.E.-Oct.'46	Forest Hills, N. Y.
Quay, Richard Paul	M.E.-Oct.'45	Erie
Quinn, Benjamin Bacharach	M.E.-Feb.'46	Ventnor City, N. J.
Quint, Herbert William	E.E.-June '46	New York, N. Y.
Rader, Jack Burdell	I.E.-June '44	Bethlehem
Ramberg, Einar Melvin	M.E.-Oct.'45	Glen Head, N. Y.
Ramsdell, Robert Cole	Arts-Oct.'43	Trenton, N. J.
Ramsey, Harry Bohlin	Ch.E.-Oct.'46	New York, N. Y.
Randall, David Virgil	Arts-June '45	Kingston
Rashmir, Lewis Irwin	E.E.-Feb.'46	Hamden, Conn.
Rasmussen-Taxdal, David Samuel	E.E.-Oct.'46	Nanticoke
Ratway, John	Ch.E.-Feb.'46	Shaft
Rawlins, Robert Daniel	Engr.-Feb.'46	Allentown
Ray, Paul James, Jr.	E.E.-Feb.'44	Bethlehem
Reehl, William Frederick	Ch.E.-June '45	Orlando, Fla.
Reese, Allen Musgrove	C.E.-Oct.'45	Toledo, Ohio
Reiber, Paul Leslie, Jr.	Met.E.-June '44	Pittsburgh
Reifsnyder, H. Nelson, Jr.	I.E.-June '44	Norristown
Reimer, Leon George	E.E.-Feb.'44	Catasauqua

Rein, George Charles, Jr.	M.E.-Feb.'46	Trenton, N. J.
Reiterman, William Frank, Jr.	Arts-June '45	Allentown
Reitzel, Nicholas Martin	Ch.E.-Feb.'46	Haverford
Remsen, William Kouwenhoven	I.E.Oct.'43	Staten Island, N. Y.
Rengert, Joseph Stephen	I.E.-Feb.'45	Allentown
Renninger, John Hartman	M.E.-Feb.'46	Shillington
Ressler, Donald Frey	E.P.-June '45	Allentown
Ressler, Robert Roland	Chem.-Oct.'43	Allentown
Rhodes, Franklin Jackson	M.E.-June '44	Bloomfield, N. J.
Richards, John Henderson, Jr.	M.E.-June '46	Mt. Lebanon
Richards, John Lawrey	Arts-Oct.'44	Lehighton
Richards, John Stuart	M.E.-Oct.'46	Philadelphia
Richards, Louis Moosbrugger	Arts & Engr. June '44	Somerville, N. J.
Richter, Raymond Luke	Bus.-Oct.'45	Bethlehem
Rider, Edmund Samuel	Met.E.-Feb.'46	Euclid, Ohio
*Riley, Anna Tully	Arts	Bethlehem
Risch, Grant	Ch.E.-June '45	Huntington, N. Y.
Ristorcelli, Joseph Raymond	M.E.-Feb.'44	Maracaibo, Venezuela
Roberts, Frank Butler	E.E.-June '44	Emmaus
Roberts, Gordon Thomas	E.E.-Feb.'44	New York, N. Y.
Rochester, Stephen Ratcliff	M.E.-Feb.'45	Eden, N. Y.
Rogers, Charles Montgomery	Bus.-Oct.'43	Dallas, Tex.
Rosenberg, Gilbert Morris	E.E.-Feb.'44	Bethlehem
Rosener, Robert Benjamin	Ch.E.-June '45	Deal, N. J.
Ross, John Alexander	Ch.E.-Oct.'43	Williamsport
Roth, Charles Allen	M.E.-Oct.'46	Allentown
Rouse, Robert Wilson	M.E.-Oct.'43	Colorado Springs, Colo.
Ruch, Floyd Howard	Ch.E.-June '45	Hellertown
Ruoff, Frederick William	Bus.-Feb.'46	Maplewood, N. J.
Rust, Philip Schuyler	E.P.-June '44	New Brunswick, N. J.
Ruthhart, Richard Mitman	Chem.-Feb.'45	Bethlehem
Sachse, Daniel Tressler III	M.E.-Feb.'46	Conyngham
Sall, Walter Gerald	Ch.E.-June '45	Miami Beach, Fla.
Salm, Henry Joachim	E.E.-Feb.'46	New York, N. Y.
Sanders, Paul William	M.E.-Oct.'43	Maplewood, N. J.
Sass, Sherman Grossman	Bus.-June '46	Allentown
Sawhill, Robert Arthur	Arts-June '46	Highlands, N. J.
Scarff, Paul Brown	Bus.-June '45	Westfield, N. J.
Schautz, John Louis, Jr.	Ch.E.-Feb.'46	Scranton
Scheier, Stephen Louis	Arts-Spl.	Bethlehem
Scheller, George Ernest	M.E.-Feb.'46	Hackettstown, N. J.
Schisler, Albert George	M.E.-June '46	Northampton
Schmaltz, Robert Edward	M.E.-Feb.'46	Scranton
Schmerken, Stanley	E.E.-Feb.'46	Brooklyn, N. Y.
Schmoyer, Donald Walter	Bus.-Oct.'44	Allentown
Schmoyer, Robert Kistler	Ch.E.-Feb.'44	Schnecksville
Schmuk, Joseph E.	Met.E.-Oct.'43	Easton
Schoch, Richard Luther	Engr.-June '44	Allentown
Schuchar, Jay Edwin	Met.E.-June '45	Philadelphia
Schulz, Robert Ernest	Arts & Engr. Oct.'46	Coopersburg
Schumacher, John Earl, Jr.	Engr.-June '45	Pottsville
Schwab, Leonard Charles	M.E.-Feb.'44	Cumberland
Schwartz, Morton Kanter	Ch.E.-Feb.'46	Wilkes-Barre
Schwartz, Seymour Melvin	C.E.-June '45	Jamaica, N. Y.

Schwartzberg, Arnold David	M.E.-June '45	Newark, N. J.
Schwarz, Mark Herman, Jr.	Engr.-June '44	Wharton, N. J.
Schwarz, Quirin John	M.E.-Oct.'43	Rutherford, N. J.
Schwarz, Ralph Grayson	M.E.-Feb.'46	Rutherford, N. J.
Schweitzer, Edward Frederick	Ch.E.-June '45	Bloomfield, N. J.
Schwemlein, William Hemmerick	M.E.-Feb.'46	Parkersburg, W. Va.
Scott, Kenneth Aikman	Ch.E.-Oct.'44	Upper Montclair, N. J.
Seasholtz, Elwood Franklin	E.P.-June '46	Allentown
Seaton, Peter Charles	M.E.-Feb.'44	Allentown
Sechrist, Harry Spurgeon	E.E.-June '45	Hellam
Segraves, John Walter	Ch.E.-Feb.'46	Easton
Seifert, Henry Burtis	M.E.-Feb.'45	Trenton, N. J.
Seifert, Rodman Harvey	C.E.-Feb.'46	Bethlehem
Seigle, Harold Joseph	Ch.E.-June '44	Philadelphia
*Selvecki, Mildred Helene	Arts	Bethlehem
Semmel, Thomas Henry	Engr.-June '44	Slatington
Sennello, William Albert	E.E.-Oct.'46	Whitestone, N. Y.
Sentz, Robert Eugene	E.E.-Feb.'46	Littlestown
Serfass, Wilson Alvin	G.C.D.	Bethlehem
Shafer, Richard Charles	M.E.-June '44	Allentown
Shaheen, Nadine Peter	Ch.E.-Feb.'46	Easton
Shane, Marvin	Ch.E.-Oct.'45	Bethlehem
Shaner, Benjamin Maurice	C.E.-June '45	Allentown
Shawhan, Hubbard William	Arts-Oct.'43	Ft. Moultrie, S. C.
Shepherd, Robert Regester	Arts-Feb.'45	St. Davids
Sherer, Thomas Lincoln II	E.E.-Oct.'44	Allentown
Sherwood, Harold DeWitt	Ch.E.-Feb.'44	Englewood, N. J.
Shettel, Don Landis	Ch.E.-Feb.'46	Harrisburg
Shewmon, Daniel Center	E.M.-Oct.'44	Plainfield, N. J.
Shintaku, Toshiaki	C.E.-Oct.'43	Pahala, Hawaii, T. H.
Shipherd, John Jay	Bus.-Feb.'46	Philadelphia
Shipley, Edward Woodruff	M.E.-Feb.'45	Harbor Beach, Mich.
Shirley, Lloyd Orin	Bus.-June '46	Schenectady, N. Y.
Shively, Robert Rex	Arts-Oct.'43	Washington
Shockcor, William Thomas	M.E.-Feb.'46	Allentown
Shook, Theodore Albert	Ch.E.-Feb.'46	Bethlehem
Shuman, John Robert	Ch.E.-June '45	Bethlehem
Sidebotham, Norman Castor	Ch.E.-June '45	Philadelphia
Simon, David Emanuel II	Ch.E.-Feb.'46	Philadelphia
Simpson, John Arol	E.P.-June '44	Stratford, Conn.
Skilling, John Morrison, Jr.	Engr.-June '44	Wilmington, Del.
Skilling, Thomas Ethelbert	M.E.-Oct.'44	New Kensington
Smith, Burton Leidy	Bus.-Oct.'46	Easton
Smith, Gordon Frederick	C.E.-Oct.'45	Portsmouth, R. I.
Smith, James Edgar, Jr.	Arts-Oct.'45	Riegelsville
Smith, John David	Bus.-Oct.'43	Los Altos, Cal.
Smith, Merrill Mark	Ch.E.-Feb.'46	Northampton
Smith, Richard Thomas	E.E.-Feb.'46	Allentown
Smith, Robert Lamphiere	M.E.-Feb.'46	Brooklyn, N. Y.
Smith, Robert Louis	C.E.-Feb.'44	Charleston, W. Va.
Smith, Vigor Cranston	M.E.-Oct.'43	Wynnewood
Smith, Willett	Arts-Feb.'46	Merion
Smoyer, Ralph Mosser	I.E.-Feb.'46	Allentown
Snelling, Richard Arkwright	C.E.-Oct.'46	Allentown
Snyder, George Whitney	M.E.-June '44	Sewickley
Snyder, Herman George Peter	M.E.-Oct.'44	Slatington

Snyder, Roy Blauvelt	Met.E.-Oct.'44	Hawthorne, N. J.
Snyder, Samuel Idell	M.E.-Oct.'43	Windber
Snyder, Wilson Pershing	Arts-Feb.'44	Minersville
Solt, David Charles	E.E.-Feb.'46	Allentown
Soltis, Howard Victor	Arts-Oct.'44	Freeland
Somers, Donald Charles	M.E.-Oct.'45	Pennington, N. J.
Soto, Alfonso Francisco	Arts-June '44	Santurce, Puerto Rico
Spangler, Arthur Philip	M.E.-Oct.'45	York
Spangler, Henry Andrew	M.E.-June '46	Scarsdale, N. Y.
Spencer, Frederick Norman	Arts-Oct.'45	Woodbridge, N. J.
Spengler, Robert Clyde	Bus.-June '46	Northampton
Spindler, Charles	Engr.-June '46	Jamaica, N. Y.
Staley, Richard Allen	Arts-Oct.'46	Reading
St. Clair, William Harold	M.E.-Feb.'44	Baltimore, Md.
Steele, David Truman	M.E.-Feb.'44	Great Mills, Md.
Sterner, Charles James	Ch.E.-June '45	Bethlehem
Sterner, William Arthur	G.C.D.	Bethlehem
Stettner, Max Harvey	Bus.-June '45	Allentown
Stevens, Thomas Schellenger II	Ch.E.-June '45	Cape May, N. J.
Stiles, Bradford Loring	Chem.-June '45	Forest Hills, N. Y.
Stockbower, Ellsworth Albert	Ch.E.-Oct.'44	North Hills
Stoeckle, William Charles	Bus.-Feb.'44	Drexel Hill
Stoehr, Roland Clifford	Arts-Feb.'44	Bayside, N. Y.
Stoll, Malcolm Harold	Bus.-June '46	New York, N. Y.
Stolz, Robert Kenneth, Jr.	E.E.-Feb.'46	E. Grand Rapids, Mich.
Stotz, Edward Wesley	Met.E.-June'45	Oakmont
Stowers, Eugene Sewell, Jr.	M.E.-Feb.'44	Bluefield, W. Va.
Stratton, Cole	M.E.-June '45	Chevy Chase, Md.
Strayer, Carl Wayne	Ch.E.-Feb.'46	York
Strehle, Frank Eberly	E.E.-Oct.'44	Philadelphia
Strober, Bennett A.	M.E.-Oct.'46	Jamaica, N. Y.
Strohl, Gilbert Hallet	G.C.D.	Bethlehem
Sturgis, William James, Jr.	E.E.-Feb.'46	New York, N. Y.
Sullivan, Cornelius Jay	Engr.-June '44	New York, N. Y.
Suman, Robert Parker	Chem.-Feb.'45	Plainfield, N. J.
Swartley, Robert Weikel	E.E.-Oct.'45	Line Lexington
Swayne, Kenneth Gilbert	M.E.-Oct.'43	George School
Szakal, Frank Eugene	Arts-June '46	Bethlehem
Szymakowski, Stanley Chester	Engr.-June '44	Bethlehem
Taylor, Edmund Randolph, Jr.	M.E.-Oct.'46	Pelham, N. Y.
Teets, Carl Sanford, Jr.	E.E.-Feb.'46	Scranton
Ten Eyck, Richard Conger	E.E.-June '46	Elizabeth, N. J.
Theurkauf, Edward August, Jr.	E.E.-Feb.'46	Montclair, N. J.
Thomas, Willis Grant, Jr.	Ch.E.-June '44	Allentown
Thompson, William Frank, Jr.	M.E.-Oct.'44	Mauch Chunk
Thomson, Albert Harvey	Engr.-June '44	Dallas City
Thomson, Arthur James	M.E.-June '46	N. Arlington, N. J.
Tichenor, William Hillier, Jr.	E.E.-Feb.'46	Matawan, N. J.
Tietje, Richard Martine	C.E.-June '46	Montclair, N. J.
Tilghman, William Beauchamp	M.E.-Oct.'43	Salisbury, Md.
Tilley, Harold Widdall	Engr.-June '44	Avoca
Tinsley, Timothy Overthier	Bus.-Feb.'46	Garden City, N. Y.
Tirrell, John Francis	M.E.-June '46	Phillipsburg, N. J.
Todd, Alfred H.	C.E.-June '44	Richmond, Va.
Tomaselli, Vincent Raymond	Ch.E.-Oct.'44	Grantwood, N. J.
Tomlinson, Joseph Newkirk	Ch.E.-Feb.'44	Bridgeton, N. J.

Tremel, Paul Stephen	Arts-Feb.'44	Hatfield
Treser, Robert Morris	Ch.E.-June '45	Richmond, Va.
Triolo, Salvatore	M.E.-Oct.'44	Passaic, N. J.
Tripician, Nicoli Emilio	M.E.-Feb.'45	Atlantic City, N. J.
Troy, John Parker	E.E.-Feb.'44	Schenectady, N. Y.
Tuberty, John Fox	Arts-Feb.'46	Allentown
Tucker, Albert Robert, Jr.	Ch.E.-Oct.'43	Wilmington, Del.
Turnbull, Maynard Henry, Jr.	Ch.E.-Feb.'46	York
Turnbull, William Davidson	M.E.-June '46	East Orange, N. J.
Turner, John Everton, Jr.	Ch.E.-Oct.'45	New Brunswick, N. J.
Tuttle, Charles Harry	Met.E.-June '46	Brooklyn, N. Y.
Vallario, Dominick Michael	Ch.E.-Oct.'44	Newark, N. J.
Van Bergh, Frederic Walter II	Ch.E.-Feb.'46	New York, N. Y.
Vannerson, Robert Aylmer	Ch.E.-June '46	Wilmington, Del.
Vetrosky, Stephen Thomas	Bus.-Oct.'44	Bethlehem
Villa, Frederick Lincoln	Arts-Oct.'43	Mount Vernon, N. Y.
Virden, Emerson Hart, Jr.	Ch.E.-Feb.'46	Ardsley, N. Y.
Voelcker, Frank Ward	Arts-Oct.'43	Philadelphia
Von Bergen, Fritz	Ch.E.-Oct.'44	Clifton, N. J.
Voros, Franklin Charles	G.C.D.	Bethlehem
Wachtel, Edwin Barton	M.E.-June '46	Wilmington, Del.
Wagner, George Harold	M.E.-June '45	Fairport, N. Y.
Walden, Robert Louis	Bus.-Feb.'46	New York, N. Y.
Walker, Harry Samuel, Jr.	G.C.D.	Bethlehem
Walkerman, Robert Koehl	M.E.-June '46	Lakewood, N. Y.
Wallick, Earle Wilbur	E.E.-Oct.'43	Washington, D. C.
Wallick, Robert Daniel	E.E.-Oct.'45	Washington, D. C.
Walter, Carl Steward	G.C.D.	Wind Gap
Walter, John Charles	Arts-June '45	Gates Mills, Ohio
Walter, Paul Charles	Arts-Feb.'46	Bethlehem
Walters, Donald Bryce	Ch.E.-Oct.'44	Bethlehem
Walters, Merlin Paul	M.E.-Feb.'44	Fullerton
Ward, Roy Clemson	E.P.-June '45	Baltimore, Md.
Waters, Bryn William	Ch.E.-June '45	Edwardsville
Wehner, William George	Ch.E.-June '45	Haverford
Weinreb, Marvin Seymour	Arts-Oct.'46	North Bergen, N. J.
Weiskopf, Daniel Albert	Arts-Feb.'45	Bethlehem
Welsh, David Harrison	Arts-June '44	Hackettstown, N. J.
Wemple, Delmont Eugene	Ch.E.-Feb.'45	Schenectady, N. Y.
Wetrich, Thomas Donald	Engr.-June '44	Hempstead, N. Y.
Wetzel, Daniel Lawrence	M.E.-Feb.'46	Bethlehem
Wetzel, Lewis Dreese	E.E.-Oct.'46	Beaver Springs
Wheeler, George Charles, Jr.	Met.E.-Oct.'44	West Englewood, N. J.
Whigham, William III	M.E.-Oct.'44	Pittsburgh
White, Edward Riall III	E.E.-Oct.'44	Salisbury, Md.
Whitehead, Charles Richard	Ch.E.-June '45	Harrisburg
Wiegand, August Fredrick	Ch.E.-Oct.'45	Fords, N. J.
Wiegand, Warren	Arts-June '45	Philadelphia
Wielkopolski, Theodore	M.E.-Oct.'43	Arlington, N. J.
Wiley, Frederick Evans, Jr.	M.E.-Oct.'44	Chester
Wiley, Robert Arthur	Bus.-Feb.'44	Ridgewood, N. J.
Williams, David Gordon	E.E.-Feb.'46	Brooklyn, N. Y.
Williams, Donald Frederick	Engr.-Oct.'46	Allentown
*Williams, Ellen Webb	Arts	Bethlehem
Williams, Richard	Ch.E.-Feb.'45	Huntington, W. Va.
Williams, Richard Owen	E.E.-June '44	Birmingham, Mich.

Williams, Richard Rhys	Arts-June '44	Bethlehem
Willis, Leland Stanford, Jr.	Met.E.-June '44	Upper Darby
*Wills, Ruth Henrietta	Arts	Bethlehem
Wilson, Alvin Turner, Jr.	M.E.-June '46	Columbus, Ga.
*Wilson, Bette-Jane Hatton	Arts	Columbus, Ga.
Wilson, James Frances	M.E.-June '44	Catasauqua
Wilson, Sanford Wright, Jr.	Ch.E.-June '45	Williamsport
Winco, Thomas Robert	Ch.E.-Oct.'44	Philadelphia
Wiss, Kenneth Bertrand	Engr.-Oct.'44	Short Hills, N. J.
Woelfel, Ralph Hartman, Jr.	Arts-June '45	Hazleton
Wolf, Donald Alan	Ch.E.-June '45	Washington, D. C.
Wolfe, Robert Andrew	C.E.-Feb.'46	Wilmington, Del.
Wolosin, Stephen Edward	Met.E.-Feb.'45	Kingston
Wright, Robert, Jr.	M.E.-June '44	Haddonfield, N. J.
Wynne, John Harvey	Met.E.-Oct.'45	Burlington, N. J.
Yastrzab, John Carl	Met.E.-Feb.'44	Northampton
Yates, Charles Louis	Engr.-Feb.'46	Ashley
Yost, Alan Edward	E.E.-June '46	Telford
Zack, Raymond Anthony	E.E.-Feb.'46	Pittston
Zackey, Roy Tyson	M.E.-June '44	Roslyn
Zane, Daniel Marvin	Arts-June '45	New York, N. Y.
Zirnite, Richard Nehring	Ch.E.-June '45	Plainfield, N. J.
Zucker, William Kenward, Jr.	Engr.-June '44	Mt. Vernon, N. Y.

*Enrolled in summer semester only

PRE-SESSION, 1943

(The names of 107 students which appear in the previous list are here omitted.)

Adams, William Knerr	Allentown
Ashworth, Everett Merritt	Croton-on-Hudson, N. Y.
Brawn, Earl Albert	West Orange, N. J.
Brawn, Ray Edwin	West Orange, N. J.
Buchanan, John Glisan	Altoona
Campbell, Claude Norman, Jr.	Haddonfield, N. J.
Collmann, Spencer Howe	Avoca
Davis, Richard William	Maplewood, N. J.
Dayton, Douglas Michel	Plandome, N. Y.
Doney, Robert Henry	Pen Argyl
Downing, Edward Jacques	Jersey City, N. J.
Etter, Faye Tyson	Bethlehem
Fisher, William H.	Philadelphia
Freed, Dale Youngman	Williamsport
Fruhwirth, Joseph Francis, Jr.	Allentown
Galli, James Henry	Portland, Me.
Geiger, Charles Samuel	Reading
Goth, Joseph Herman, Jr.	Bethlehem
Hartman, Thomas Leo	Mt. Lebanon
Herold, Charles Peter	Baltimore, Md.
Hertig, John Lloyd	Kenvil, N. J.
Jackson, Thomas Edgar	Bethlehem
B.S. in M.E., M.S. *(Carnegie Institute of Technology, Lehigh University).*	
Karas, John Athan	Lebanon
Kleckner, Ulysses Frederick	Allentown
LeRoy, Gaynor Otto Henry	Newburgh, N. Y.
Levy, I. Harrison	Akron, Ohio
Mohrey, Raymond Thomas	Bethlehem
Mooney, Richard Stanton	Newark, N. J.
Mullen, Thomas Justiss	Whitehouse, N. J.
Musselman, Nina Mae	Bethlehem
Orth, Edward Alan	Chicago, Ill.
Piro, Philip Anthony	White Haven
Raring, Frederick William	Linglestown
Rosenthal, Charles Field	New York, N. Y.
Scalzi, Francis Paul	Meriden, Conn.
Seaman, David E.	Haddonfield, N. J.
Seward, Nym Kenneth	Luzerne
Snyder, Jackson Seidel	Shillington
Strobino, Frank Leo	Haledon, N. J.
Tench, Guy Walter	West Pittston
Thayer, Bruce William	Evanston, Ill.
Ullmann, Thomas Mifflin	Bethlehem
Walling, Richard Raymond	East Cleveland, Ohio
Weaver, Robert James	Montclair, N. J.
Werner, Robert Edward	Palmerton
Wetzel, Charles Mark	Wayne
Youtz, John Aaron	Haddonfield

SUMMER SESSIONS, 1943

Ackley, Jean A. P. — Allentown
B.S. in Ed. (*Temple University*)

Albright, Esther Clementine — Coopersburg

Aoki, Gertrude — Springtown

Bealer, Carolyn Maude — Bethlehem
B.A. (*Moravian College for Women*)

Bennett, John Harold — Bethlehem

Bock, Louis — Allentown
B.S. in Ed. (*Moravian College*)

Boyer, Miriam Lathea — Allentown
B. S. (*Ithaca College*)

Brawn, Ray Edwin — West Orange, N. J.

Brown, Charles Ernest — Hellertown
B. S. (*Moravian College*)

Bunger, Reuben Walter — Bethlehem
Ph.B. (*Muhlenberg College*)

Congdon, Ednagene Wray — Bethlehem

Curtis, George Bartlett — Bethlehem
A.B., A.M. (*Wesleyan University, Columbia University*)

Delluva, Angeline Marie — Bethlehem
B.S. in Ed. (*Muhlenberg College*)

Dodd, Gilbert Blake — Stroudsburg
B.S. in Ed. (*East Stroudsburg State Teachers College*)

Doney, Robert Henry — Pen Argyl

Erb, Albert Schmidt — Easton
B.S., M.A. (*Muhlenberg College, Lehigh University*)

Etter, Faye Tyson — Bethlehem

Fink, Paul Jacob — Allentown
B.A., M.A., (*Ohio State University*)

Fisher, William Henry — Philadelphia

Geissinger, Sarah Anne — Bethlehem
A.B., M.A. (*Wilson College, Lehigh University*)

Getz, Pauline Vivian — Bethlehem
B.S. in Ed. (*Muhlenberg College*)

Hahn, Catherine Emmaline — Bath
B.A. (*Ursinus College*)

Heller, Estella Ruth — Pen Argyl
B.S. in Ed. (*Muhlenberg College*)

Hertz, John Atlee — Bethlehem
A.B. (*Moravian College*)

Illick, Montford Elroy — Hellertown
B.S. (*Lafayette College*)

Johnston, Jean Hale — Bethlehem

Jones, Ethel Carhart — Bethlehem

Koons, Dorothy Wright — Bethlehem

Koons, Marion Wright — Bethlehem
B.A. (*Moravian College for Women*)

Lambert, Beulah Florine — Bethlehem
B.S. in Ed. (*Muhlenberg College*)

Laubenstein, Carl Benedict — Coopersburg
B.S. (*Muhlenberg College*)

Lutz, Margaret Louise — Bethlehem
B.A. (*Moravian College for Women*)

Mains, Floreine Anderson — Bethlehem
B.F.A. (*University of Colorado*)

Maxwell, Santa Margaret — Bethlehem

McAndrew, Hannah Louise — Bethlehem
B.S. in Ed. (*Muhlenberg College*)

McCreedy, Mary — Bethlehem
B.S. (*Muhlenberg College*)

McDowell, Elsie M. — Bethlehem
B.A., M.A. (*Moravian College for Women, Lehigh University*)

McGonigle, Mary Elizabeth Caroline — Allentown

McPherson, Donald Wesley — Hellertown
B.S. (*West Chester State Teachers College*)

Miller, Margaret Delfreta — Bangor
A.B. (*Ursinus College*)

Moser, William Gustave — Nazareth
A.B. (*Muhlenberg College*)

Muschlitz, Ruth Elizabeth — Bethlehem

Neast, Betty Martha — Mauch Chunk
B.S. (*Ursinus College*)

Nehf, Charles Henry — Allentown
B.S. in Ed. (*Muhlenberg College*)

Oskin, Mary Louise — Bethlehem

Phillips, Mary Kathryn — Bath
B.S. (*West Chester State Teachers College*)

Platoff, Zena — Quakertown
B.S. (*Drexel Institute*)

Redding, Jennie Pierok — Bethlehem
B.A. (*Moravian College for Women*)

Reese, William John, Jr. — Slatington
B.S., M.A. (*Moravian College, Columbia University*)

Ritter, Ralph Shelly — Allentown
E.E. (*Lehigh University*)

Ritter, William John — Bethlehem

Roche, Helen Patricia — Bangor
A.B. (*St. Josephs College*)

Rogers, Alice M. — Phillipsburg, N. J.

Sabatine, John William — Roseto
B.S. (*Muhlenberg College*)

Schermann, Irma Eleanore — Ottsville
B.S. (*West Chester State Teachers College*)

Schick, Leonard Hubert — Bethlehem
B.A. (*Lehigh University*)

Schlenker, Herbert John — Kutztown
B.S. (*Albright College*)

Shunk, Harold Francis — Bethlehem
B.S. (*Lafayette College*)

Stein, Oscar Llewellyn — Kutztown
A.B., A.M. (*Franklin and Marshall College, Columbia University*)

Strauss, Mildred Kline — Emmaus
A.B. (*Cedar Crest College*)

Swartz, Elizabeth Jane — Bethlehem

Teufer, Gertrude Albrecht — Bethlehem
B.S. in Ed. (*West Chester State Teachers College*)

Thayer, Bruce William — Evanston, Ill.

Thomas, Ethel — Slatington
B.S. in Ed. (*Muhlenberg College*)

Weaver, Katherine Amelia — Bethlehem
B.A. (*Cedar Crest College*)

Wilson, John Watkins — Bethlehem

Witmeyer, Marianne Gladys — Bethlehem
B.A., M.A. (*Moravian College for Women, Lehigh University*)

Wood, Wilbur Calvin — Allentown
B.S. (*East Stroudsburg State Teachers College*)

TRAINEES

Curriculum abbreviations are explained in the preceding pages.

Name	*Curriculum and Term*	*Dates of Attendance*
Abell, Paul	E.E.1-4,5	Oct. 11-Mar. 25
Abreu, Anthony	B.E.2-1,2	Oct. 11-Mar. 25
Achenbach, Robert William	B.E.1-1,2B	Oct. 11-Feb. 9
Ackerman, Robert Bird	F.A.L.(G)-4,5,6	July 12-Mar. 25
Adamus, Sigmund Victor	B.E.1-1	Relieved, July 8
Ahrens, Herman Conrad	B.E.2-1,2	Oct. 11-Mar. 25
Aiello, Richard	B.E.1-1,2	Oct. 11-Mar. 25
Alderton, Leonard Edwin, Jr.	B.E.2-1,2	Oct. 11-Mar. 25
Allar, Samuel	Ch.E.1-4A1; C.E.1-4,5	July 12-Mar. 25
Allen, Jack	B.E.1-1,2B	Oct. 11-Mar. 25
Allen, Jean Gilpin	B.E.1-1	July 12-Oct. 2
Allyn, Herbert Orwell	B.E.1-1	July 12-Oct. 2
Amish, Keith Warren	E.E.1-6	Jan. 10-Mar. 25
Anderman, Frank	B.E.1-1	Oct. 11-Jan. 1
Anderson, Francis Charles	F.A.L.(G)-4,5,6	July 12-Mar. 25
Anderson, Robert Earl	M.E.1-4A1,4	Oct. 11-Mar. 25
Anderson, Wallace Stafford	B.E.1-1	Oct. 11-Jan. 1
Andrews, Edward Williamson, Jr.	A.E.S3-4	Jan. 10-Mar. 25
Antonopoulos, Leo	B.E.1-1,2	July 12-Jan. 1
Apotheker, Jerry	B.E.1-1	Oct. 11-Dec. 3
Armao, Lewis	F.A.L.(F)-4,5,6	July 12-Mar. 25
Armstrong, Francis John	B.E.1-1	Oct. 11-Dec. 3
Armstrong, George Conover	B.E.1-1,2B	Oct. 11-Mar. 25
Arnoff, Ezra Leonard	M.E.1-4,5	Oct. 11-Mar. 25
Arnone, Charles Ralph	B.E.2-1; B.E.1-1	Oct. 11-Mar. 25
Arntz, Kenneth T.	B.E.1-1	Oct. 11-Oct. 16
Arslanian, Vincent Vaskin	Ch.E.-4; A.E.S1-5,6	July 12-Mar. 25
Artl, Lawrence Joseph	F.A.L.(G)-4	July 12-Oct. 2
Ashura, Joseph Michael	M.E.1-4,5,6	July 12-Mar. 25
Auble, Robert Comley	M.E.1-4A1,4	Oct. 11-Mar. 25
*Auerswald, Edgar H., Jr.	B.E.1-1	Oct. 11-Jan. 1
Augustin, Harvey Henry	B.E.1-1,2	Oct. 11-Mar. 25
Auld, Malcolm Graeme	B.E.1-1,2	July 12-Jan. 1
Averbach, Louis Harry	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Babine, William Henry	B.E.1-1,2B	Oct. 11-Mar. 25
Baden, Michael	C.E.1-4	Oct. 11-Jan. 1
Baer, Ruben Jules	B.E.1-1,2,3	July 12-Mar. 25
*Bakal, Daniel	B.E.1-1	Oct. 11-Jan. 1
Baker, Lyman Merritt	M.E.1-5,6	Oct. 11-Mar. 25
Baker, Sigmund	F.A.L.(G)-4,5,6	July 12-Mar. 25
Balistreri, Frank George	B.E.1-1	July 12-Aug. 26
Balkany, Ernest	M.E.1-4A; A.E.S3-4	Oct. 11-Mar. 25
Ball, Robert John	M.E.1-4A1,4	July 12-Dec. 4
Ball, Rodger	B.E.1-1,2	Oct. 11-Mar. 25
Balliet, Ralph Elmer	B.E.1-1	Oct. 11-Jan. 1
Balling, William Joseph	M.E.1-4,5	Oct. 11-Mar. 25
Bamford, Sidney Ross	B.E.1-1,2	July 12-Jan. 1
Bandzin, John Victor	B.E.1-1,2B	Oct. 11-Mar. 25

*Reservists

Name	*Curriculum and Term*	*Dates of Attendance*
Bangs, Bolton	E.E.1-5,6	Oct. 11-Mar. 25
Bannan, Thomas Sheridan	B.E.-5E	Jan. 10-Feb. 14
Barber, James Warren, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Barbour, Harbert William	C.E.1-4A1,4,5	July 12-Mar. 25
Bard, Charleton Cordery	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Bard, James Belford	C.E.1-4A1,4	July 12-Jan. 1
Barmby, Albert Roy	E.E.1-4,5	Oct. 11-Mar. 25
Barnes, James Henry	F.A.L.(G)-4,5,6	July 12-Mar. 25
Barrett, Robert Edward	B.E.1-1,2	July 12-Jan. 1
Barrick, Robert Francis	B.E.1-1	July 12-Oct. 2
Barritt, Carlyle Westbrook	F.A.L.(G)-4,5,6	July 12-Mar. 25
Barton, Rufus William	B.E.1-1,2	Oct. 11-Mar. 25
Bartoo, James Breese	B.E.1-1,2,3	July 12-Mar. 25
Baskin, Martin Murray	B.E.2-1,2	Oct. 11-Mar. 25
Batchelor, William Thurman	B.E.1-1,2	July 12-Nov. 17
Bates, Paul Erwin	B.E.1-1,2B	Oct. 11-Mar. 25
Battiato, Joseph Salerno	E.E.1-4,5	Oct. 11-Mar. 25
Battistone, Rudolph	B.E.1-1,2	July 12-Jan. 1
*Baum, Martin Eli	B.E.1-1	Oct. 11-Jan. 1
Baum, Robert George	B.E.1-1	Oct. 11-Jan. 1
Baumgartner, Norman William	M.E.1-4,5	Oct. 11-Mar. 25
Beach, Dale Stuart	M.E.1-5,6	Oct. 11-Mar. 25
Bean, Richard Lloyd	M.E.1-4,5	Oct. 11-Mar. 25
Beane, Emery Oliver, Jr.	B.E.1-1,2	July 12-Jan. 1
Bear, Ralph J.	B.E.1-1	Oct. 11-Jan. 1
Beardsley, Clinton James	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Becka, Robert Joseph	B.E.1-1R,1,2	July 12-Mar. 25
Beckwith, David	E.E.1-5	Oct. 11-Jan. 1
Beeken, Basil Brooke	C.E.1-4A1	Oct. 11-Jan. 1
Belikove, Bernard Samuel	B.E.1-1,2	July 12-Jan. 1
Belitsos, Constantinos Charles	B.E.2-1	Oct. 11-Dec. 4
Bell, Ferdinand Cortez, Jr.	B.E.1-1,2	Oct. 11-Mar. 25
Bell, Stanley Herbert	C.E.1-4,5	Oct. 11-Mar. 25
Bemis, Roscoe Howe	B.E.1-1	Oct. 11-Jan. 1
*Benesch, Charles	B.E.1-1	Oct. 11-Jan. 1
Benigno, Vincent Angelo	B.E.1-1	Oct. 11-Jan. 1
Benjamin, Richard Wyman	B.E.1-1,2,3	July 12-Mar. 25
Berg, Charles Burnham	B.E.1-1,2	Oct. 11-Mar. 25
Berger, John Franklin	E.E.1-4A1,4,5	July 12-Mar. 4
*Berger, Murry Pearson	B.E.1-1	Jan. 10-
Bergin, Joseph Thomas	Ch.E.-4A1	July 12-Oct. 2
Bergman, Warren Carl	B.E.2-1,2	Oct. 11-Mar. 25
Berndt, Harris LaMont	B.E.1-1,2B	Oct. 11-Mar. 25
Bernier, Charles Murray	B.E.1-1,2B	Oct. 11-Feb. 9
Bernstein, Everett Mayer	Ch.E-4A1; E.E.4,5	July 12-Mar. 25
Beroes, Charles Stephen	F.A.L. (G)-4,5,6	July 12-Mar. 25
Berruti, Louis Anthony	B.E.1-1R,1,2	July 12-Feb. 12
Bettmann, Robert Edward	B.E.1-1,2	Oct. 11-Mar. 25
Beutler, John Albert, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Bierman, Harry	F.A.L.(F)-4,5,6	July 12-Mar. 25
Biernacki, John Anthony	B.E.1-1,2B	Oct. 11-Mar. 25
*Billet, William Calvin	B.E.1-1	Oct. 11-Jan. 1
Birmingham, Stephen Richard	B.E.1-1,2	Oct. 11-Mar. 4
Birmingham, William F.	B.E.1-1	Oct. 11-Jan. 1

Name	*Curriculum and Term*	*Dates of Attendance*
Birnbaum, Edward	B.E.1-1,2,3	July 12-Mar. 25
Bischke, Russell George	B.E.1-1,2	Oct. 11-Mar. 25
Bittman, Bernard	F.A.L.(G)-4,5,6	July 12-Mar. 25
Blackburn, Gerald Robert	M.E.1-4	Oct. 11-Jan. 1
Blackburn, Robert Lloyd	B.E.1-1	Oct. 11-Dec. 3
Blackwell, John Sheldon	M.E.1-4A1,4,5	July 12-Feb. 9
Blair, Edgar Wayne	E.E.1-4,5	Oct. 11-Mar. 25
Bleul, George John	C.E.1-5	Jan. 10-Feb. 14
Blevens, Bertram Guy	B.E.1-1,2	July 12-Jan. 1
Bliss, William Everard	B.E.1-1,2,3	July 12-Mar. 25
Bloom, Alfred Harold	B.E.1-1	Oct. 11-Jan. 1
Bloom, William Bernard	B.E.1-1,2	Oct. 11-Mar. 25
Bloss, Thomas Wheeler	M.E.1-5,6	Oct. 11-Mar. 25
Bocarski, Raymond Richard	B.E.1-1,2,3	July 12-Mar. 4
Bock, Alexander Pershing	F.A.L.(F)-4,5,6	July 12-Mar. 25
Boehme, John William	B.E.2-1,2	Oct. 11-Mar. 25
Boehmer, John Francis	B.E.1-1,2	July 12-Jan. 1
Boinest, Munro Lebby, Jr.	Ch.E.-4A1; E.E.-4,5	July 12-Mar. 25
Bond, George William, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Bond, John Cauley	B.E.1-1	July 12-Sept. 25
Bonney, Richard Henry	C.E.1-4,5	Oct. 11-Mar. 25
Bookwalter, Arthur Lee	B.E.1-1,2B,3B	July 12-Mar. 25
Booton, Orland Howson	F.A.L.(F)-4,5,6	July 12-Feb. 14
Bora, Douglas Arthur	B.E.1-1,2	Oct. 11-Mar. 25
Boring, Randolph Onus	F.A.L(G)-4,5,6	July 12-Feb. 14
Bornstein, Melvine Bruce Arnold	E.E.1-4,5	Oct. 11-Mar. 25
Bossert, Thomas Richard	B.E.1-1,2	Oct. 11-Mar. 25
Bostian, Ralph Alexander	B.E.1-1	Oct. 11--Dec. 4
Boudreaux, Charles A.	M.E.1-4A1	July 12-Oct. 2
Bourke, Richard DeLaney	B.E.2-1	Oct. 11-Jan. 1
Bovarnick, Bennett	M.E.1-4,5,6	July 12-Mar. 25
Bove, Joseph Robert	B.E.1-1	Oct. 11-Jan. 1
Bowles, John A.	E.E.1-4A,4,5	July 12-Mar. 25
Bowley, John Tripp	E.E.1-4,5	Oct. 11-Mar. 25
Bowling, Cecil James, Jr.	Ch.E.-4; A.E.S1-5,6	July 12-Mar. 25
Bowman, Howard Chester	F.A.L.(G)-4,5	July 12-Jan. 1
Boyette, Richard Clayton	B.E.2-1,2	Oct. 11-Mar. 4
Boykin, Lemuel Whitaker, Jr.	M.E.1-4	Oct. 11-Jan. 1
Boyle, Robert Louis	B.E.1-1	Oct. 11-Jan. 1
Bradfield, Vernal Glen	E.E.1-4A1	Oct. 11-Jan. 1
Bradford, Edwin	E.E.1-4,5	Oct. 11-Mar. 25
Bradford, Ward Allen	M.E.1-4,5	Oct. 11-Feb. 14
Bradley, James Vandiver	E.E.1-4,5	Oct. 11-Mar. 25
Bradley, John Carl	B.E.1-1	July 12-Sept. 25
Bradley, John Edward	M.E.1-4,5,6	July 12-Mar. 25
Brand, Grant Anthony	B.E.1-1	July 12-Sept. 25
Brani, Richard Francis	B.E.1-1,2B,3B	July 12-Mar. 25
*Braun, Edward George, Jr.	B.E.1-1	Jan. 10-
Braus, Horace	C.E.-4A1; E.E.-4,5	July 12-Mar. 25
Breen, Daniel Joseph	B.E.1-1,2B	Oct. 11-Mar. 25
*Brennan, Francis Xavier	B.E.1-1	Jan. 10-Feb. 25
Brewster, Theodore Edwards	B.E.1-1,2	Oct. 11-Mar. 4
Bright, William Horace	M.E.1-4A1,4,5	July 12-Mar. 25
Brink, Edward Thompson	M.E.1-4,5	Oct. 11-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
*Brister, Donald	B.E.1-1	Jan. 10-Mar. 4
*Brister, Walter Allen	B.E.1-1	Jan. 10-Mar. 4
Brittain, Alfred III	F.A.L.(F)-4,5,6	July 12-Mar. 2
Brooks, Rayford Lee	B.E.1-1	July 12-Oct. 2
Brosius, Allen Dalton	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Brown, Boyce McNair, Jr.	B.E.1-1,2	Oct. 11-Mar. 4
*Brown, Charles Everett, Jr.	B.E.1-1	Oct. 11-Jan. 1
*Brown, David E.	B.E.1-1	Oct. 11-Jan. 1
Brown, George Hafer	B.E.-5E	Jan. 10-Feb. 14
Brown, Harold Morrell	E.E.1-4,5	Oct. 11-Mar. 25
Brown, Horace Carl	M.E.1-4,5	Oct. 11-Mar. 25
Brown, Howard Hale	C.E.1-4,5	Oct. 11-Mar. 25
Brown, Jack Shawver	M.E.1-4A1	Oct. 11-Jan. 1
Brown, James Wendell	Ch.E.-4A1; M.E.4,5	July 12-Mar. 25
Brown, Robert	B.E.1-1,2	July 12-Nov. 17
Brown, Rodney Francis	B.E.1-1	July 12-Sept. 25
Brown, William Warriner	B.E.2-1,2	Oct. 11-Mar. 4
Browne, Donald Frederick	B.E.1-1,2B	Oct. 11-Mar. 25
Brozosky, Richard Harold	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Bruhn, Robert Ernest	B.E.1-1,2	July 12-Jan. 1
Brunenkant, Edward James	C.E.1-4,5	Oct. 11-Mar. 22
Brunswick, John Henry	F.A.L.(F)-4,5	July 12-Jan. 1
Bryson, George Dalton	B.E.2-1,2	Oct. 11-Mar. 4
Buchanan, Harry Winters	M.E.1-4,5	Oct. 11-Mar. 25
Buck, Richard John	B.E.1-1,2	Oct. 11-Mar. 25
Buck, Richard William	M.E.1-5,6	Oct. 11-Feb. 29
Burke, Rex E.	C.E.1-4A1	July 12-Sept. 25
Burke, Walter Elwood	M.E.1-5,6	Oct. 11-Mar. 25
*Burket, Robert Eugene	B.E.1-1	Oct. 11-Jan. 1
Burmaster, Carl Edward	E.E.1-4,5	Oct. 11-Mar. 25
Burns, William Augustine	C.E.1-4A1	Oct. 11-Jan. 1
Busch, George William	Ch.E1-4; A.E.S1-5,6	July 12-Feb. 19
Busta, Edmund A.	B.E.1-1,2	Oct. 11-Mar. 25
Butcher, Joseph Edwin	C.E.1-4A1,4,5	July 12-Mar. 25
Butkier, George William	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Butler, Richard Gordon	B.E.1-1	July 12-Sept. 5
Buxton, Kenneth Walter	E.E.1-4A1	Oct. 11-Jan. 1
Byrd, Joseph Kincaid	B.E.1-1,2	Oct. 11-Mar. 25
Byrne, Peter Joseph	B.E.2-1	Oct. 11-Jan. 1
Cag, Stanley	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Cahill, Alfred Lawrence	B.E.2-1	Oct. 11-Jan. 1
Cain, Charles Edward	M.E.1-4A1,4,5	July 12-Mar. 25
Caliendo, Charles Philip	B.E.2-1	Oct. 11-Jan. 1
Camacho, John Gregory	B.E.1-1	July 12-Sept. 25
*Campbell, Wallace Hall	B.E.1-1	Jan. 10
Canfield, Clayton, Jr.	B.E.1-1,2,3	July 12-Mar. 25
*Canfield, William Charles	B.E.1-1	Oct. 11-Jan. 1
Cannon, John Berkman, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Cappuccino, Nicholas Joseph	B.E.1-1,2,3	July 12-Mar. 25
Cardman, Michael Lawrence	F.A.L.(F)-4,5	July 12-Jan. 1
Cardwell, Martin Joseph, Jr.	B.E.1-1	July 12-Sept. 25
Carl, Robert Samuel	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Carr, Donald Carlos	B.E.1-1,2	July 12-Nov. 17
Carr, Francis Patrick	F.A.L.(F)-4,5,6	July 12-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Carragher, James Joseph	M.E.1-4A1,4,5	July 12-Feb. 25
Carroll, Jabez Francis, Jr.	B.E.1-1,2	July 12-Jan. 1
Carson, Clyde Lester	F.A.L.(F)-4	July 12-Oct. 2
Carter, Richard Bowlby	C.E.1-4A1; E.E.1-4	July 12-Jan. 1
Cary, Wilbur Fisk	E.E.1-4A1	July 12-Aug. 27
Cassidy, William Henry, Jr.	B.E.1-1	July 12-Sept. 25
Castellano, Carmine Chris	B.E.1-1	Oct. 11-Jan. 1
Catts, John Gleason	E.E.1-4,5	Oct. 11-Mar. 25
Caudell, Martin Julian	B.E.1-1	July 12-Aug. 26
Cavano, Robert Roy	E.E.1-4,5	Oct. 11-Mar. 25
*Celli, Joseph John	B.E.1-1	Jan. 10-Feb. 5
Champion, Charles Hale	F.A.L.(G)-4,5,6	July 12-Feb. 29
*Chandler, Roy F.	B.E.1-1	Oct. 11-Jan. 1
Chapman, Lloyd Earle	M.E.1-4,5	Oct. 11-Mar. 25
Chase, Ellsworth Harry	B.E.1-1,2	July 12-Jan. 1
Chass, Melvin M.	F.A.L.(F)-4,5,6	July 12-Mar. 25
Chaya, Henry John	E.E.1-4,5	Oct. 11-Mar. 25
Cheatham, Joseph Montgomery	F.A.L.(F)-4,5,6	July 12-Mar. 25
*Chiera, Jacob Andrew	B.E.1-1	Jan. 10-
Chirco, Michael August	C.E.1-4A,4,5	July 12-Mar. 25
*Cicone, Anthony Francis	B.E.1-1	Jan. 10-
Ciletti, Vincent John	B.E.1-1,2	Oct. 11-Mar. 25
Clark, Benjamin Franklin	B.E.1-1,2,3	July 12-Mar. 4
Clark, Hezekiah	B.E.1-1,2B	Oct. 11-Mar. 25
*Clark, Howard Hurlbutt, Jr.	B.E.1-1	Oct. 11-Jan. 1
Clark, Jack Meridith	B.E.1-1	July 12-Aug. 26
Clark, Louis Stinson	B.E.1-1,2	July 12-Dec. 4
Clark, Ronald Scott	E.E.1-4A1,4	July 12-Jan. 1
Clark, William Allison	M.E.1-5,6	Oct. 11-Feb. 29
Clausen, Leonard Morris	B.E.1-1,2B,3B	July 12-Feb. 12
Clausen, Robert Detlef	F.A.L.(F)-4,5	July 12-Jan. 1
*Cleaver, John Wellington, Jr.	B.E.1-1	Oct. 11-Jan. 1
Cleland, Charles Elsworth	E.E.1-4,5	Oct. 11-Mar. 25
Clemo, Clifford Benton, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Clinton, William Patrick	Ch.E.1-4,5,6	July 12-Mar. 25
Cloghessy, William Francis	B.E.1-1	Oct. 11-Jan. 1
Coburn, George Martin	F.A.L.(G)-4,5,6	July 12-Mar. 25
Cochran, Gordon Sullivan	M.E.1-4,5	Oct. 11-Mar. 25
Coffey, Linn William	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 7
*Cohen, Marshall Harris	B.E.1-1	Jan. 10-
Cohen, Norman	B.E.1-1	Relieved, Oct. 9
*Colbs, Marvin	B.E.1-1	Jan. 10-
Cole, Manley William	E.E.1-4,5	Oct. 11-Mar. 25
Collier, James Edward	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Collins, Julian Lester	B.E.1-1,2,3	July 12-Mar. 25
*Comer, Asher	B.E.1-1	Jan. 10-
*Conboy, James Patrick	B.E.1-1	Oct. 11-Jan. 1
*Conn, Robert Alexander	B.E.1-1,2	Oct. 11-
Conner, James Mervin	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Contreras, Fred T.	B.E.1-1	Oct. 11-Oct. 16
Conway, Paul Joseph	B.E.1-1,2	Oct. 11-Mar. 4
Cook, Jack Dean	M.E.1-4,5	Oct. 11-Mar. 25
Cooke, Lyman Lewis	B.E.1-1,2B	Oct. 11-Mar. 25
Cooks, Herbert	F.A.L(G)-4,5,6	July 12-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Cooper, Duncan Elwood	B.E.1-1	July 12-Aug. 26
Cooper, George Duane	B.E.1-1,2,3	July 12-Mar. 4
Cooper, Ronald Loyal	B.E.-5E	Jan. 10-Feb. 14
Copperman, Meyer	Ch.E.1-4A1; E.E.-4,5	July 12-Mar. 25
Corcoran, Martin John	M.E.1-4,5,6	July 12-Mar. 25
Corkill, John Thomas	F.A.L.(F)-4,5,6	July 12-Mar. 25
Corning, Horace Francis, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
*Cosby, Laurence Gilbert	B.E.1-1	Oct. 11-Jan. 1
Courtney, Howard Wright, Jr.	B.E.-5E	Jan. 10-Feb. 14
Covaleski, Leo Edward	F.A.L.(G)-4	July 12-Oct. 2
*Cowan, Henry Shaw, Jr.	B.E.1-1	Jan. 10-
Cox, Charles Woodfin	B.E.1-1,2	July 12-Jan. 1
Cox, Frank Amos	B.E.1-1,2	Oct. 11-Mar. 4
Crabtree, George William	F.A.L.(F)-4	July 12-Aug. 18
Craigie, Hugh Alexander	M.E.1-4A1,4,5	July 12-Mar. 25
Crannell, Wayne Tolly	B.E.1-1,2B,3B	July 12-Mar. 25
Cross, Arthur Benjamin	F.A.L.(F)-4,5,6	July 12-Feb. 29
Crutsinger, William Taylor	B.E.1-1R	July 12-Oct. 2
Cryder, John Henry, Jr.	M.E.1-5,6	Oct. 11-Mar. 25
Cumming, Edward Knapp, Jr.	M.E.1-5	Jan. 10-Feb. 14
*Curtis, Robert Linwood	B.E.1-1	Jan. 10-
Curtis, Allan Augustin, Jr.	B.E.1-1,2	July 12-Jan. 1
Cyr, William Leon	B.E.1-1	July 12-Oct. 2
Dalton, Grant Rennard	B.E.1-1	Oct. 11-Dec. 3
*D'Angelo, Richard Thomas	B.E.1-1	Oct. 11-Dec. 23
Davenport, Francis Evan	F.A.L.(F)-4,5,6	July 12-Feb. 14
Davidson, Peter Robertson	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Davis, John Barnes	B.E.1-1,2,3	July 12-Mar. 25
DeGennaro, Vincent Nicholas	M.E.1-4,5	Oct. 11-Mar. 25
DeHuff, John Andrew	C.E.1-4,5	Oct. 11-Mar. 25
Dein, Jacob W.	Ch.E.-4A1; E.E.-4,5	July 12-Mar. 25
*Deinish, Robert John	B.E.1-1	Jan. 10-Feb. 12
Deis, Leopold	E.E.1-4,5	Oct. 11-Mar. 4
Dell, Abraham	E.E.1-4A1,4,5	July 12-Mar. 4
DeLong, Otis Clinton, Jr.	C.E.1-4A1	July 12-Oct. 2
DeMunguia, Peter Vire	F.A.L.(G)-4,5,6	July 12-Mar. 25
Densmore, Harold Franklin	B.E.2-1,2	Oct. 11-Mar. 25
Dettor, Joseph John, Jr.	B.E.1-1,2	Oct. 11-Mar. 4
Deutsch, Bernard	B.E.1-1,2B,3B	July 12-Mar. 4
Deutsch, Richard Bernard	M.E.1-4,5,6	July 12-Mar. 25
DeVogue, Eugene James	B.E.1-1,2	Oct. 11-Mar. 25
Dewlin, John M.	B.E.1-1,2	Oct. 11-Mar. 4
Dibble, Dwight Sherman	Ch.E.1-4,5,6	July 12-Mar. 25
DiBiagio, Raymond Eugene	C.E.1-4,5	Oct. 11-Mar. 25
*Dickinson, David Alan	B.E.1-1	Oct. 11-Jan. 1
Diebler, Homer Wesley	M.E.1-4A1,4,5	July 12-Mar. 25
Diefenderfer, James Carroll, Jr.	B.E.2-1,2	Oct. 11-Mar. 25
Diehm, William Hertzler	M.E.1-4,5	Oct. 11-Mar. 25
DiGiacoma, Robert	B.E.1-1,2B,3B	July 12-Mar. 25
Diller, George Parker	B.E.1-1,2	July 12-Jan. 1
DoBish, Chester Boleslaw	B.E.1-1,2B,3B	July 12-Mar. 25
Dobkin, Donald Irwin	B.E.1-1,2,3	July 12-Mar. 25
Domingos, Richard Burden	B.E.1-1,2B,3B	July 12-Feb. 12
*Donati, Francis John	B.E.1-1	Oct. 11-Dec. 4

Name	*Curriculum and Term*	*Dates of Attendance*
Donato, William Anthony	B.E.1-1,2B,3B	July 12-Mar. 25
Dorné, Donal Paine	Ch.E.1-4;A.E.S1-5,6	July 12-Mar. 25
Dorrance, James Harlan	B.E.1-1	July 12-Sept. 25
Dourlain, Roland Edwin	B.E.1-1,2	Oct. 11-Feb. 4
Dove, John Reese	Ch.E.1-5	Oct. 11-Jan. 1
Downey, Garner Harris	E.E.1-4,5	Oct. 11-Mar. 25
Dowsley, George William	B.E.1-1,2B,3B	July 12-Mar. 25
Doyle, James Aloysius	F.A.L.(F)-4,5,6	July 12-Mar. 25
Drewry, William Page	E.E.1-4,5	Oct. 11-Mar. 25
Dronenburg, Herbert Frisbee	B.E.1-1,2	Oct. 11-Mar. 25
Drouin, Rene Joseph	B.E.1-1	Oct. 11-Jan. 1
*Drummond, Robert John	B.E.1-1	Oct. 11-Dec. 3
Duke, Alexander Theodore	B.E.1-1	Oct. 11-Jan. 1
Dunfee, James Houston	B.E.1-1,2	July 12-Jan. 1
Dunham, William Shaw	B.E.1-1	July 12-Sept. 25
Dupress, John Kenneth	B.E.1-1,2	Oct. 11-Feb. 4
Dykstra, Louis John	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Dzmura, Lawrence Michael	B.E.1-1	July 12-Sept. 25
Eckard, Carl Edward	B.E.1-1R	July 12-Sept. 25
Eddy, Howard	E.E.1-4A1,4,5	July 12-Mar. 25
Edholm, Eric	B.E.1-1,2	Oct. 11-Mar. 25
Edwards, Herbert John	B.E.1-1,2	Oct. 11-Feb. 4
Egan, Philip Marshall	B.E.1-1	Oct. 11-Jan. 1
Egan, Thomas Joseph	B.E.1-1,2,3	July 12-Mar. 25
Eggerton, Albert Sidney, Jr.	B.E.1-1,2B,3B	July 12-Mar. 25
*Egolf, James Hunt	B.E.1-1	Jan. 10-Jan. 28
Ekengren, Paul Allyn	B.E.1-1,2	July 12-Jan. 1
Elder, James Albert	B.E.1-1,2	Oct. 11-Mar. 25
Ellis, Arthur Aaron	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Elston, Wendell LeRoy	B.E.1-1	July 12-Oct. 2
Engle, Alan William	E.E.1-4	Oct. 11-Nov. 29
Erdheim, William	B.E.1-1,2B	Oct. 11-Mar. 25
*Erickson, Cornelius James	B.E.1-1	Jan. 10-
Ermentrout, George Bard	B E.1-1,2,3	July 12-Mar. 25
Eshelman, John David	B.E.1-1,2	July 12-Jan. 1
Essex, John Harold	B.E.1-1,2,3	July 12-Mar. 25
Eugley, Jenness Pearl	E.E.1-5,6	Oct. 11-Mar. 25
Evans, Earl Radford, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Evans, James Albert	F.A.L.(F)-4,5	July 12-Jan. 1
Everett, Norman Armstrong	M.E.1-4,5	Oct. 11-Mar. 25
Ewen, William John	B.E.1-1	July 12-Sept. 25
Fagen, Joseph	F.A.L.(G)-4,5,6	July 12-Feb. 29
Fahlander, Lennart Albert	B.E.1-1	July 12-Oct. 2
Falk, Andrew Eric	B.E.1-1,2,3	July 12-Mar. 25
Fancher, Charles Edward	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Fantin, Richard Aloysius	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Farley, Robert Edward	B.E.2-1	Oct. 11-Jan. 1
Farrell, William Bartholomew, Jr.	B.E.-5E	Jan. 10-Feb. 14
Feeman, James Frederick	M.E.1-4,5	Oct. 11-Mar. 25
Feigin, William Murray	E.E.1-4A1,4,5	July 12-Mar. 25
Feldman, Roger E. H.	M.E.1-4A1	Oct. 11-Jan. 1
Ferretti, Renato John	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Ferry, Bert Stinson	F.A.L.(F)-4	July 12-Aug. 26
*Fesemyer, Arthur John	B.E.1-1	Oct. 11-Jan. 1

Name	*Curriculum and Term*	*Dates of Attendance*
Fewer, William	B.E.1-1	July 12-Sept. 25
Field, John Russell	B.E.1-1	Oct. 11-Jan. 1
Finkelstein, Harold David	B.E.2-1,2	Oct. 11-Mar. 25
Finley, Albert Earl	B.E.1-1R	July 12-Sept. 11
*Fisher, Arthur C.	B.E.1-1	Oct. 11-Jan. 1
*Fisher, Herbert Burton	B.E.1-1	Jan. 10-
Fisher, Lewis Richard	E.E.1-4,5	Oct. 11-Mar. 25
Fishman, Morris	F.A.L.(G)-4,5,6	July 12-Feb. 29
Fitzgerald, Arthur Henry	B.E.1-1,2B	Oct. 11-Mar. 25
Fitzgerald, Francis James	E.E.1-4A1	Oct. 11-Jan. 1
Fitzgerald, Edward Richard	B.E.1-1,2	Oct. 11-Mar. 4
Fitzgerald, James Harold, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Fitzpatrick, William James	E.E.1-5,6	Oct. 11-Feb. 9
*Fleig, Joseph Elsworth	B.E.1-1	Oct. 11-Jan. 1
Flesner, Leonard John	Ch.E.-4A1; E.E.-4,5	July 12-Mar. 4
Fletcher, Harry	B.E.1-1	July 12-Aug. 26
Flower, Robert Alban	E.E.1-5,6	Oct. 11-Mar. 25
Flynn, John James	M.E.1-5,6	Oct. 11-Mar. 25
*Foderaro, Anthony Harolde	B.E.1-1,2	Oct. 11-
Forbush, Bliss, Jr.	C.E.1-4A1;A.E.S3-4	Oct. 11-Mar. 25
Foreman, Wesley Paul	M.E.1-4A1-4,5	July 12-Mar. 25
Forgotson, Maurice	B.E.2-1,2	Oct. 11-Mar. 25
Forney, Merrill Eugene	E.E.1-4,5	Oct. 11-Mar. 25
Forsythe, Frank Amos	B.E.1-1,2	July 12-Jan. 1
Fox, Carroll Martin	B.E.1-1,2,3	July 12-Mar. 4
Fox, Joe Neale	M.E.1-4A1	Oct. 11-Jan. 1
*Frank, Louis, Jr.	B.E.1-1	Jan. 10-
Franken, Allan Chase	B.E.1-1	July 12-Sept. 25
*Freedman, Arthur Raymond	B.E.1-1	Jan. 10-
Freund, Walter Joseph, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Friberg, Arvid Elvin	C.E.1-4A1,4,5	July 12-Mar. 25
*Friedland, Martin Nelson	B.E.1-1	Jan. 10-Mar. 4
Friedman, Marvin	B.E.1-1,2	Oct. 11-Mar. 25
Fucci, Joseph Ralph	B.E.1-1,2B,3B	July 12-Mar. 25
Fuchs, Richard Louis	E.E.1-4,5	Oct. 11-Mar. 25
Fullington, Emmett Small	B.E.1-1	July 12-Oct. 2
Gaetano, Frank William	B.E.1-1,2	Oct. 11-Mar. 25
Gaffney, Thomas William	B.E.1-1,2	Oct. 11-Mar. 4
Gall, William Dale	B.E.1-1,2	July 12-Jan. 1
Galner, Bertram	B.E.1-1,2	Oct. 11-Mar. 25
Gardner, Norman Duncan	B.E.1-1,2	July 12-Jan. 1
Garrett, Robert Spalding	F.A.L.(F)-4	July 12-Oct. 2
Geare, John Edward	B.E.1-1	July 12-Oct. 2
Gechijian, Haig Garo	E.E.1-4,5	Oct. 11-Mar. 25
Gedeon, Walter Norbert	B.E.1-1R,1	July 12-Jan. 1
Gehr, John Edwin	B.E.-5E	Jan. 10-Jan. 14
Geib, Karl William	B.E.1-1,2B	Oct. 11-Mar. 25
Genereux, Robert Francis	B.E.1-1	July 12-Oct. 2
*Gettlin, Leo Ira	B.E.1-1	Oct. 11-Jan. 1
Gianni, Anthony Joseph	B.E.1-1,2B	Oct. 11-Mar. 25
Gibson, Wilfred Alan	M.E.1-4,5	Oct. 11-Mar. 25
Gilbert, Donald Allan	B.E.1-2	Oct. 11-Jan. 1
*Gilbert, Samuel Theodore	B.E.1-1	Jan. 10-
Gilleran, John Joseph	B.E.1-1,2B,3B	July 12-Feb. 12

Name	*Curriculum and Term*	*Dates of Attendance*
Gillis, Donald Stanley	E.E.1-4A,4	Oct. 11-Mar. 25
Gilmore, Andrew Paul	B.E.1-1,2	Oct. 11-Mar. 25
Gisburne, Edward Hamlin	E.E.1-5,6	Oct. 11-Mar. 25
Gitterman, David Lloyd	B.E.1-1	July 12-Oct. 2
Gittler, Max	M.E.1-5,6	Oct. 11-Mar. 25
Given, John Robert	M.E.1-5	Oct. 11-Dec. 13
Glady, Roy Allen	B.E.1-1,2	July 12-Jan. 1
Glanztman, Louis	B.E.2-1	Oct. 11-Jan. 1
Glascock, Robert Owings	B.E.1-1,2B	Oct. 11-Mar. 25
Glen, Lester Nathaniel	B.E.1-1,2	Oct. 11-Mar. 25
Glick, Harold	B.E.1-1,2	Oct. 11-Mar. 25
Glicksman, Abraham	M.E.1-4A1;E.E.1-4,5	July 12-Mar. 25
Glieberman, Sheldon Leonard	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Glisson, J. W.	B.E.1-1R,1	July 12-Jan. 1
Glowienka, Linus Lucius	B.E.1-1,2B,3B	July 12-Mar. 25
Goddard, Frederick Clarke	C.E.1-4A1,4,5	July 12-Mar. 25
Goldberg, Bernard	Ch.E.1-4A1; C.E.1-4,5	July 12-Mar. 25
*Goldberg, Russell Gordon	B.E.1-1	Oct. 11-Jan. 1
Goldenberg, Emanuel Solomon	B.E.1-2	Oct. 11-Jan. 1
Golding, Laurence Calvert	C.E.1-4A1,4,5	July 12-Mar. 25
Goldman, Harry Aaron	B.E.1-1,2	Oct. 11-Mar. 25
*Goldman, Morton Harold	B.E.1-1	Oct. 11-Jan. 1
Goldstein, Bernard Murry	B.E.1-1,2,3	July 12-Mar. 4
Goldstein, Nathan II	F.A.L.(F)-4,5,6	July 12-Feb. 14
Goldstein, Stanley Lawrence	B.E.2-1,2	Oct. 11-Mar. 25
Goodding, Robert Arthur	Ch.E.1-4,5,6	July 12-Mar. 25
Goodnow, Weston Whitney, Jr.	M.E.1-5,6	Oct. 11-Mar. 25
Gopen, Aaron Harry	Ch.E.1-4A1,4	July 12-Jan. 1
Gordon, Philip Donald	M.E.1-5,6	Oct. 11-Mar. 25
Gotkiewicz, Julian Adam	B.E.1-1,2B	Oct. 11-Mar. 25
Gottfried, Donald Franklin	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Gottschall, Richard Carl	B.E.-5E	Jan. 10-Feb. 14
Gould, Arthur Samuel, Jr.	F.A.L.(F)-4,5,6	July 12-Mar. 25
*Gould, James Ralph	B.E.1-1	Oct. 11-Dec. 3
Grammer, Frederick Louis	Ch.E.1-4A1,4,5	July 12-Mar. 25
Grant, Raymond Loren	B.E.2-1,2	Oct. 11-Mar. 25
Grassi, Donald	E.E.1-4,5	Oct. 11-Mar. 25
Gray, Robert A., Jr.	B.E.1-1,2	Oct. 11-Mar. 25
Greef, Edward Ballou	M.E.1-4A1,4,5	July 12-Mar. 25
Green, George Warren	B.E.1-1,2B,3B	July 12-Mar. 4
Green, Russell Herbert	E.E.1-4,5	Oct. 11-Mar. 25
Greenberg, William Jay	E.E.1-4,5	Oct. 11-Mar. 4
Greene, Harris Carl	F.A.L.(G)-4,5,6	July 12-Mar. 25
*Greenfield, Arthur Cooper	B.E.1-1	Jan. 10-
*Greenwald, Irwin David	B.E.1-1,2	Oct. 11-Mar. 14
Greer, Charles Marshall	B.E.2-1	Oct. 11-Jan. 1
Gregory, Edgar Francis	B.E.1-1,2B	Oct. 11-Mar. 25
Griffith, James Kenneth	B.E.1-1,2	July 12-Jan. 1
Grillo, Thomas Edward	M.E.1-4A1	Oct. 11-Jan. 1
*Grim, Bobby Marshall	B.E.1-1	Jan. 10-
Groman, Richard Frederick	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Gross, William Henry, Jr.	C.E.1-4A1,4,5	July 12-Mar. 25
Grosser, Bernard Harold	B.E.2-1	Oct. 11-Jan. 1
Grubb, Joel Neal	B.E.1-1,2	Oct. 11-Mar. 4

Name	*Curriculum and Term*	*Dates of Attendance*
*Gruber, Arthur Fels	B.E.1-1	Jan. 10-Mar. 4
*Gulley, William Grady	B.E.1-1	Jan. 10-
Gumenik, Joseph George	F.A.L.(F)-4,5,6	July 12-Mar. 25
*Gummoe, Neal I.	B.E.1-1	Oct. 11-Jan. 1
Gursey, Walter Richard	F.A.L.(G)-4,5,6	July 12-Mar. 25
Gutmacher, Harris	B.E.1-1,2	Oct. 11-Mar. 4
Gysler, Rudolph Charles	F.A.L.(F)-4,5	July 12-Dec. 3
Haas, Gilbert Tyndall	B.E.1-1,2	Oct. 11-Mar. 25
*Haden, Thomas Lawrence	B.E.1-1	Oct. 11-Dec. 3
Hafner, Claude Joseph	B.E.-5E	Jan. 10-Feb. 14
*Hagerty, Carl William	B.E.1-1	Oct. 11-Jan. 1
Haldeman, John Stanley	E.E.1-5	Jan. 10-Jan. 17
Hale, Garner	B.E.1-1,2	July 12- Jan. 1
*Hall, Robert Swart	B.E.1-1	Jan. 10-
Hallman, John Roland	E.E.1-4,5	Oct. 11-Feb. 12
*Halperin, Benjamin Arthur	B.E.1-1	Jan. 10-
Halpern, Martin Leonard	B.E.2-1,2	Oct. 11-Mar. 25
Hamilton, Harold Philip	B.E.1-1,2B,3B	July 12-Mar. 4
Hamrick, Emmett Willard	F.A.L.(G)-4,5,6	July 12-Mar. 25
Handran, Llewellyn, Jr.	B.E.1-1,2	Oct. 11-Mar. 25
Hanerfeld, Edward Solomon	F.A.L.(G)-4,5,6	July 12-Mar. 25
Hannon, Joseph William	B.E.1-1	Oct. 11-Jan. 1
*Hannum, Howard Leon	B.E.1-1	Oct. 11-Jan. 1
Haren, Ralph Joseph	M.E.1-5,6	Oct. 11-Mar. 25
*Harle, Louis Aloysius, Jr.	B.E.1-1	Jan. 10-
Harmuth, Raymond Joseph	B.E.1-1	Oct. 11-Dec. 3
Harris, Daniel	B.E.2-1,2	Oct. 11-Mar. 25
Harris, Raymond Harold	B.E.1-1,2,3	July 12-Mar. 4
Harro, William Paul	M.E.1-4	Oct. 11-Jan. 1
*Hart, Robert Warren	B.E.1-1	Oct. 11-Dec. 4
*Hartman, William Prideaux	B.E.1-1	Oct. 11-Jan. 1
Hartwell, Arthur Malcolm	B.E.1-1,2B	Oct. 11-Mar. 25
Hast, John Stephen	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Haught, Wilford Robert	B.E.1-1	July 12-Oct. 2
Hauser, William Henry	B.E.2-1,2	Oct. 11-Mar. 25
Hayden, John James	B.E.1-1,2B,3B	July 12-Feb. 10
Haynes, Aubrey Franklin	B.E.1-1,2B,3B	July 12-Mar. 25
Healy, Henry Sturmer	Ch.E.1-4A1	July 12-Sept. 25
Heaney, James Andrew	B.E.1-1	July 12-Sept. 25
Hecht, David	B.E.1-1,2B,3B	July 12-Mar. 4
Heck, Theodore Guy	B.E.-5E	Jan. 10-Feb. 14
Heider, Richard Campbell	B.E.1-1,2B,3B	July 12-Mar. 25
Heimberg, Isaac	F.A.L.(F)-4,5,6	July 12-Mar. 25
Heinz, Richard Peter	B.E.1-1,2B,3B	July 12-Mar. 25
Heinzel, Gunther	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Heise, William Frederick	M.E.1-5,6	Oct. 11-Mar. 25
Heithaus, John Bernard, Jr.	B.E.1-1,2,3	July 12-Mar. 4
*Hellmann, Charles Rex	B.E.1-1	Oct. 11-Jan. 1
Hendrix, Charles Elbert	B.E.1-1	July 12-Oct. 2
Herbert, Richard Joseph	E.E.1-5,6	Oct. 11-Mar. 25
Hermon, Fred Edward	Ch.E.1-4,5,6	July 12-Mar. 25
*Hersh, Joseph Sholom	B.E.1-1	Jan. 10-
Hester, Thurman O'Neal	B.E.1-1,2B	Oct. 11-Mar. 25
Hickson, William Alexander	E.E.1-4A1,4,5	July 12-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Higgins, Joseph Anthony Denis	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Higgins, Joseph Lawrence	B.E.2-1,2	Oct. 11-Mar. 25
Higgins, Robert Lee	M.E.1-5,6	Oct. 11-Mar. 25
Highfield, William Henry	Ch.E.1-6	Jan. 10-Feb. 29
Hilbert, Richard Wolcott	E.E.1-4A1,4	July 12-Jan. 1
Hile, William L.	B.E.1-1,2	Oct. 11-Feb. 5
Hill, Fred	F.A.L.(F)-4	July 12-Sept. 25
Hill, James Hague	M.E.1-4,5,6	July 12-Mar. 25
Hill, Robin George	B.E.1-1,2	Oct. 11-Mar. 4
Hill, William Paul	B.E.1-1,2,3	July 12-Mar. 25
Hines, William Harold	B.E.1-1,2,3	July 12-Mar. 25
Hisgen, Jean Warner	B.E.1-1	July 12-Oct. 2
Hodges, Joseph Ludlow	B.E.1-1	July 12-Oct. 2
Hoffman, Dan William	E.E.1-5	Oct. 11-Jan. 29
*Hoffman, Durbin C., Jr.	B.E.1-1	Oct. 11-Jan. 1
Hoffman, George	E.E.1-4,5	Oct. 11-Mar. 15
Hoffman, Milton	B.E.1-1,2,3	July 12-Mar. 25
*Hoffman, Walter Arthur, Jr.	B.E.1-1	Jan. 10-
Hogan, Joseph Stephen	B.E.1-1,2,3	July 12-Mar. 25
*Hogan, Walter Jennings, Jr.	B.E.1-1	Jan. 10-
Hogsett, John Norman	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Hoidahl, Robert Irving	M.E.1-4	Oct. 11-Jan. 1
Holland, George Wilton	B.E.1-1	July 12-Oct. 2
Holloway, George Leonard	M.E.1-4A1,4,5	July 12-Mar. 25
Hollows, Ernest William	F.A.L.(G)-4,5,6	July 12-Mar. 25
Holm, Edward Wilbur	M.E.1-4,5,6	July 12-Mar. 25
Holt, Virgil Charles	M.E.1-4A1, 4	July 12-Dec. 3
Hopwood, William Sterling	F.A.L.(F)-4,5,6	July 12-Mar. 25
Horn, Charles	C.E.1-4A1,4,5	July 12-Mar. 25
Horn, Robert Walter	F.A.L(G)-4,5,6	July 12-Mar. 25
Hosford, William Coe	Ch.E.1-4,5,6	July 12-Mar. 25
Houston, William Osborne	M.E.1-4,5	Oct. 11-Mar. 25
Howland, Richard Charles	B.E.1-1,2B	Oct. 11-Mar. 25
Hrebicek, Edward Louis	F.A.L.(G)-4,5,6	July 12-Mar. 25
*Hubbard, William Franklin	B.E.1-1	Jan. 10-
Hudack, John Edward	F.A.L.(G)-4	July 12-Sept. 25
*Hughes, Byron Gail	B.E.1-1,2	Oct. 11-Mar. 4
Hull, Winfield Scott	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Hume, William Gray	B.E.1-1,2B,3B	July 12-Feb. 10
Hunt, Joel Andrews	F.A.L.(G)-4,5	July 12-Jan. 1
Hunt, Joseph Vernon	B.E.1-1,2B	Oct. 11-Feb. 9
Hurter, William Howard	B.E.1-1,2B,3B	July 12-Mar. 25
Hussa, Edwin Frederic, Jr.	M.E.1-5,6	Oct. 11-Feb. 29
Huxley, Fred E.	B.E.1-1	July 12-Oct. 2
Hyde, Richard Loring	B.E.1-1,2	Oct. 11-Feb. 8
Inman, Martin Mack	M.E.1-4A1;A.E.S3-4	Oct. 11-Mar. 25
Irons, Wayne Conley	E.E.1-4A1,4,5	July 12-Feb. 12
Irwin, James Henry	B.E.1-1	Oct. 11-Jan. 1
*Isakson, William John	B.E.1-1	Jan. 10-
Isleib, Ernest Martin	B.E.1-1	Oct. 11-Jan. 1
*Jacobs, Harold Stanley	B.E.1-1	Jan. 10-
Jacoby, Clyde Roedell, Jr.	B.E.1-1	Oct. 11-Jan. 1
Jamieson, William	B.E.1-1,2,3	July 12-Mar. 25
Jennings, Herbert Frank	Ch.E.1-4A1,4	July 12-Jan. 1

Name	*Curriculum and Term*	*Dates of Attendance*
Jensen, Roy Charles, Jr.	M.E.1-4	Oct. 11-Jan. 1
*Jessel, Anthony John	B.E.1-1	Jan. 10-
*Jett, Lewis Archie, Jr.	B.E.1-1,2	Oct. 11-
John, David	B.E.1-1,2	Oct. 11-Feb. 8
Johns, Robert Lawrence	B.E.1-1,2	Oct. 11-Feb. 14
Johnsen, Clarke Ned	B.E.1-1,2	Oct. 11-Mar. 25
Johnson, Frank Semrow	M.E.1-4A1,4,5	July 12-Mar. 25
Johnson, George Stanley	M.E.1-4,5,6	July 12-Mar. 25
Johnson, James Tillery	B.E.2-1,2	Oct. 11-Mar. 25
Johnson, Kermit Kent	E.E.1-4	Oct. 11-Jan. 1
Johnson, Nicholas	M.E.1-4A1	Oct. 11-Jan. 1
Johnson, Paul Elden	B.E.1-1R	July 12-Sept. 25
Johnson, Paul Kirk	C.E.1-4	Oct. 11-Dec. 4
Johnson, Ralph Whitney	M.E.-4A1; A.E.S3-4	Oct. 11-Mar. 25
Johnson, Raynard James	M.E.1-4,5	Oct. 11-Mar. 25
Jolliff, Reade Bolling	B.E.1-1,2	Oct. 11-Mar. 25
Jones, Richard Owen	M.E.1-4,5,6	July 12-Mar. 25
Jordan, James Lamar	B.E.2-1,2	Oct. 11-Mar. 4
*Jordan, James Thomas	B.E.1-1	Jan. 10-
Joslin, Charles Raymond	B.E.2-1,2	Oct. 11-Mar. 25
Joynes, Lewis	B.E.1-1	Oct. 11-Jan. 1
*Jubb, Vernon Joseph	B.E.1-1	Oct. 11-Dec. 4
Judge, Martin Berkley	M.E.1-4,5	Oct. 11-Mar. 25
Jupina, Theodore Roosevelt	B.E.2-1,2	Oct. 11-Mar. 25
Kadin, Harry	F.A.L.(G)-4,5,6	July 12-Mar. 25
Kalberer, Stanley Strasser	B.E.1-1,2,3	July 12-Mar. 25
Kaleshy, Louis Peter	F.A.L.(G)-4,5,6	July 12-Feb. 14
Kaltreider, Walter Howard, Jr.	C.E.1-4,5	Oct. 11-Mar. 25
Kalyvas, Robert	B.E.1-1,2B,3B	July 12-Mar. 25
Kammerer, Allan Leroy	B.E.1-1	Oct. 11-Jan. 1
Kanowitz, Henry	B.E.1-1,2B	Oct. 11-Mar. 25
Kaplan, Bernard Wesley	B.E.1-1,2,3	July 12-Mar. 4
Kapner, Lawrence	M.E.1-4A1	Oct. 11-Jan. 1
Kapp, Henry Hermann	F.A.L.(G)-4	July 12-Sept. 25
Karelis, Saul Jacob	F.A.L.(G)-4,5	July 12-Nov. 15
Karl, John Francis	B.E.1-1,2B	Oct. 11-Feb. 9
Karraker, David George	E.E.1-4,5	Oct. 11-Mar. 4
*Kartman, Leslie M.	B.E.1-1	Jan. 10-
*Katz, Lee Robert	B.E.1-1	Oct. 11-Jan. 1
Kaufman, Morris	B.E.1-1,2B	Oct. 11-Mar. 25
Kaufman, Stuart Firth	F.A.L.(F)-4,5	July 12-Jan. 1
Kaufmann, John Joseph	B.E.1-1	Oct. 11-Jan. 1
*Kean, Edward Louis	B.E.1-1	Oct. 11-Jan. 1
Keating, William Joseph	B.E.1-1,2B,3B	July 12-Mar. 4
Keckler, Norman Floyd	Ch.E.1-4,5,6	July 12-Mar. 25
Keenan, John Howard	M.E.1-5,6	Oct. 11-Feb. 29
*Kelbaugh, Willard Paul	B.E.1-1	Oct. 11-Jan. 1
*Keller, Donald Lee	B.E.1-[illegible]	Jan. 10-
*Keller, Frank John	B.E.1-[illegible]	Jan. 10-
Keller, George Freeman	M.E.1-5,6	Oct. 11-Feb. 29
Kelley, James E.	M.E.1	Relieved, Nov. 12
Kelley, Kenneth Randall	B.E.1-1,2	Oct. 11-Mar. 25
Kelley, Richard Ashley	E.E.1-4	Oct. 11-Jan. 1
Kemp, Clayton, Arthur	B.E.1-1	Oct. 11-Jan. 1

Name	*Curriculum and Term*	*Dates of Attendance*
Kemp, Stuart Page	B.E.2-1,2	Oct. 11-Mar. 25
Kemper, Paul Phillip	B.E.1-1,2,3	July 12-Mar. 25
Kenneally, Charles Francis	B.E.1-1,2	Oct. 11-Mar. 25
Kennedy, Robert Eberhard	B.E.1-1	July 12-Sept. 25
Kershner, Henry Edwin	C.E.1-4A1,4,5	July 12-Mar. 25
Kershner, Leo William	B.E.2-1	Oct. 11-Jan. 1
Kespert, Harold Philip	B.E.1-1,2B,3B	July 12-Mar. 25
Kessel, Harry William	B.E.1-1	Oct. 11-Jan. 1
Keyser, Kermit	M.E.1-4A1,4	July 12-Nov. 16
Kindel, William Harvey	M.E.1-4,5	Oct. 11-Mar. 25
King, N. T., Jr.	B.E.1-1	Oct. 11-Jan. 1
King, Quentin	B.E.1-1,2B,3B	July 12-Mar. 4
King, Robert Blake	B.E.1-1R,1,2	July 12-Mar. 25
King, Robert Morris	B.E.1-1R,1,2	July 12-Mar. 4
King, Spencer Minor	Ch.E.1-4A1,E.E.1-4,5	July 12-Mar. 25
King, Wilfred Edwin	B.E.1-1	Oct. 11-Jan. 1
*Kinney, John Joseph Reardon	B.E.1-1	Oct. 11-Jan. 1
Kinney, William Neill	B.E.1-1,2	Oct. 11-Mar. 4
Kipp, Carl Paul, Jr.	M.E.1-4A1,4,5	July 12-Mar. 25
*Kirkman, William III	B.E.1-1	Jan. 10-
Kitchen, Wayde Donald	B.E.1-1,2	July 12-Jan. 1
Klann, Robert Woods	M.E.1-4,5	Oct. 11-Mar. 25
Klein, Emil Joseph	B.E.1-1	Oct. 11-Jan. 1
Klein, Morton Monroe	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Klein, Robert Bye	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
*Klema, Michael Augustine	B.E.1-1	Oct. 11-Jan. 1
Klotz, Herbert Werner	F.A.L.(F)-4,5,6	July 12-Mar. 25
Klusacek, Emil Rudolph	B.E.1-1,2B,3B	July 12-Mar. 4
Knaust, Herman Karl	B.E.1-1,2B,3B	July 12-Mar. 25
Knierim, Robert Henry	B.E.1-1,2,3	July 12-Mar. 25
*Knight, Robert Leros	B.E.1-1	Jan. 10-Feb. 12
Knoll, Kenneth Robert	B.E.-5E	Jan. 10-Feb. 14
Knupper, Herman R.	B.E.1-1	Oct. 11-Oct. 16
Kobick, David Gleeson	M.E.1-4,5	Oct. 11-Mar. 25
*Koch, Alfred Louis	B.E.1-1	Jan. 10-
Koehl, Billy Glenn	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
*Kohn, Richard Edward	B.E.1-1	Oct. 11-Jan. 1
Kolb, Eugene Joseph	F.A.L.(F)-4,5	July 12-Jan. 1
Kolmar, Hanns Herman	F.A.L.(F)-4,5	July 12-Jan. 1
Kolodner, Morris	C.E.4A1;F.A.L.(G)-5,6	July 12-Feb. 29
Komyathy, Joseph Charles	F.A.L.(G)-4,5,6	July 12-Mar. 25
Konatsotis, John James	B.E.1-1	Oct. 11-Jan. 1
*Konigsburg, David	B.E.1-1	Oct. 11-Jan. 1
Kaniowski, John Michael	B.E.1-1,2B,3B	July 12-Mar. 25
Kopp, Loran John	B.E.1-1,2B,3B	July 12-Mar. 25
Koppel, Lloyd George	M.E.1-5,6	Oct. 11-Mar. 25
Kordys, Stanley Charles	E.E.1-4,5	Oct. 11-Mar. 25
Korsen, Stephen Eugene	F.A.L.(G)-4,5,6	July 12-Mar. 25
Koukalik, Alan Don	B.E.1-1,2	Oct. 11-Mar. 25
Kraft, Ralph Wayne, Jr.	M.E.1-4A1	Oct. 11-Jan. 1
Kramer, Clarence J.	F.A.L.(G)-4,5,6	July 12-Mar. 25
Kramer, Thomas John	B.E.1-1,2,3	July 12-Mar. 25
Krenek, George William	B.E.1-1,2,3	July 12-Mar. 25
Krewer, William Anthony	E.E.1-4,5	Oct. 11-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Krieg, Arthur B.	B.E.1-1,2B,3B	July 12-Feb. 12
Krieger, Robert Blair	B.E.1-1,2B,3B	July 12-Mar. 25
Krizan, Martin	B.E.1-1R,1,2	July 12-Mar. 25
Kroeckel, Richard Eugene	B.E.1-1,2B,3B	July 12-Mar. 25
Krowl, George Washington	E.E.1-4,5	Oct. 11-Mar. 25
Krueger, Elmer Helmuth	B.E.1-1	July 12-Oct. 2
Krueger, Keith Vernon	B.E.1-1,2B,3B	July 12-Mar. 25
Krupit, Bert	B.E.1-1,2,3	July 12-Mar. 25
Kuhns, Richard Francis, Jr.	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
*Kunkel, Guy Allan	B.E.1-1	Jan. 10-
*Kurtak, Joseph Albert	B.E.1-1	Jan. 10-
Kushner, George Thomas, Jr.	E.E.1-4	Oct. 11-Jan. 1
Kwast, Chester Zozislaw	M.E.1-4,5,6	July 12-Mar. 25
Kyle, Thomas Robert	B.E.1-1R,1,2	July 12-Mar. 25
*Labdik, George Francis	B.E.1-1	Oct. 11-Jan. 1
Lada, Walter	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
LaFauci, Warren Guy	M.E.1-5,6	Oct. 11-Mar. 25
Laferriere, Raymond John	M.E.1-4,5	Oct. 11-Mar. 25
Lafferty, Archie William	C.E.1-4A1	July 12-Sept. 29
Laing, Stanley George	B.E.1-1R	July 12-Sept. 25
Lake, Edward Henry	C.E.1-4A1	Oct. 11-Jan. 1
Lambert, Robert Harold	B.E.1-1	July 12-Oct. 2
Lambur, Donald Carl	B.E.1-1	July 12-Sept. 25
Lammers, Kenneth Maurice	B.E.1-1,2B,3B	July 12-Mar. 25
Lamonds, Harold Augustus	B.E.1-1	July 12-Sept. 5
LaMonica, Frank	B.E.1-1R,1,2	July 12-Mar. 4
Lamoureaux, Robert Jackson	M.E.1-4A1	Oct. 11-Jan. 1
Lampert, Robert Paul	M.E.1-4,5	Oct. 11-Feb. 29
Lance, Walter Newton, Jr.	B.E.1-1,2B	Oct. 11-Mar. 25
Landay, Nathan Norton	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Landry, William Frederick	B.E.1-1	Oct. 11-Jan. 1
Landnum, Roland	B.E.1-1	July 12-Sept. 25
Lane, Ide Roy, Jr.	M.E.1-4	Oct. 11-Jan. 1
Lane, William Taylor	F.A.L.(G)-4,5	July 12-Jan. 1
Lang, Bernard David	B.E.1-1,2B	July 12-Jan. 1
Lang, Emmett Thomas	B.E.1-1,2	Oct. 11-Mar. 25
Langbehn, Herman	B.E.2-1,2	Oct. 11-Mar. 25
Lanigan, James Patrick	B.E.1-1,2	Oct. 11-Mar. 25
Lapidus, Victor	B.E.1-1,2B	Oct. 11-Mar. 25
Lapell, Wesley Dean	B.E.1-1,2	July 12-Jan. 1
Larkin, Joseph Francis	B.E.2-1,2	Oct. 11-Mar. 25
*LaRosa, Russell Francis	B.E.1-1	Jan. 10-
Larson, Rudolph Gustav	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Laser, John Armand	B.E.1-1R	July 12-Sept. 25
Lathrop, Harold Eugene	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Lautz, Edward George, Jr.	B.E.1-1,2B	Oct. 11-Mar. 25
Lavelle, John Floyd	B.E.1-1,2B	Oct. 11-Mar. 25
Lawless, Vincent Michael	M.E.1-4,5	Oct. 11-Mar. 25
Lechner, Herbert Milton	B.E.1-2	Oct. 11-Jan. 1
Lederman, Robert Charles	B.E.1-1,2B,3B	July 12-Mar. 25
Lee, Arnold St. Jacques	M.E.1-4,5	Oct. 11-Mar. 25
Lehman, Roland Glenn	B.E.1-1	July 12-Oct. 2
Leighty, William Geoffrey	B.E.1-1,2B	Oct. 11-Mar. 4
Leissa, Richard Fred	B.E.1-1	July 12-Oct. 2

Name	*Curriculum and Term*	*Dates of Attendance*
Leitner, Frank Nicholas	B.E.-5E	Jan. 10-Feb. 14
Leive, Mark Adam	B.E.2-1; B.E.1-1	Oct. 11-Mar. 25
Lenihan, Daniel Patrick	B.E.1-1,2,3	July 12-Mar. 4
Leonard, Carl Shuford, Jr.	B.E.1-1R,1,2	July 12-Mar. 25
Leonard, Dominick Aloysius	F.A.L.(F)-4,5,6	July 12-Mar. 25
Leone, Gaetano Joseph	B.E.1-1,2	Oct. 11-Feb. 4
Lesser, Richard George	C.E.1-4A1	Oct. 11-Jan. 1
Lester, Gerald William	B.E.1-1	Oct. 11-Jan. 1
Lester, William Clyde	B.E.1-1R	July 12-Sept. 25
Leventhal, William Jean	B.E.1-1,2,3	July 12-Mar. 4
Levi, Irving	M.E.1-4A1,4,5	July 12-Mar. 25
Levine, Abraham Richard	Ch.E.1-4A1;E.E.1-4,5	July 12-Mar. 25
Levine, Philip	F.A.L.(G)-4,5,6	July 12-Mar. 25
Lewis, Albert Reedy	F.A.L.(F)-4,5,6	July 12-Feb. 29
Libak, William	F.A.L.(G)-4	July 12-Aug. 26
*Liberman, Harry	B.E.1-1	Jan. 10-
Licht, William Charles	E.E.1-1,2	July 12-Jan. 1
Lichterman, Harlan Sheldon	B.E.1-1,2B,3B	July 12-Feb. 12
Liebenrood, Arthur Edward	B.E.1-1	July 12-Sept. 25
Liedel, Thomas Herbert	B.E.1-1R	July 12-Sept. 25
Lighthall, Harry, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Lilien, Otto Michael	B.E.1-1,2B,3B	July 12-Mar. 25
Lillguist, Arthur Thomas	B.E.1-1	Oct. 11-Dec. 4
LiMandri, John Michael	F.A.L.(F)-4,5,6	July 12-Mar. 25
Limanek, Stephen John	E.E.1-4,5	Oct. 11-Mar. 25
Limbus, George Constantine	B.E.1-1	July 12-Sept. 25
Lindsay, William Tenney, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Lindsay, William Webster	M.E.1-4,5	Oct. 11-Mar. 25
Lindsey, Eugene Elmer	Ch.E.1-4,5	July 12-Jan. 1
Linter, Thomas Joseph	F.A.L.(G)-4,5	July 12-Nov. 5
Lipke, John Frederick	Ch.E.1-4A1,E.E.1-4,5	July 12-Mar. 25
Littell, Walter Ricks	C.E.1-4A1,4	July 12-Jan. 1
Littleton, Louis Andrew	E.E.1-4,5	Oct. 11-Mar. 25
Lloyd, David Elmer	E.E.1-1,2B	Oct. 11-Feb. 11
Locker, Harry Dean	M.E.1-4,5	Oct. 11-Mar. 25
Lockman, Paul Kenneth	B.E.1-1,2B,3B	July 12-Mar. 4
Lockshin, Herbert	E.E.1-4,5	Oct. 11-Mar. 25
Logiudice, Vincent John	B.E.1-1,2	July 12-Jan. 1
Looft, Fred John, Jr.	E.E.1-5,6	Oct. 11-Mar. 25
Loope, Clarence LeRoy, Jr.	B.E.1-1,2,3	July 12-Mar. 4
Lord, Daniel Fred	M.E.1-4,5	Oct. 11-Mar. 25
Loskot, Victor Francis	C.E.1-4A1,4,5	July 12-Mar. 25
Lothrop, Elmer E.	B.E.1-1	Oct. 11-Dec. 3
Lowe, Richard Sidney	B.E.2-1,2	Oct. 11-Mar. 25
Lowman, Calvin Rutherford	B.E.1-1,2B	Oct. 11-Mar. 25
Lowney, John Thomas	B.E.1-1,2	Oct. 11-Mar. 25
Lucas, Thomas	B.E.1-1,2	July 12-Jan. 1
Lundgren, Robert Harding	E.E.1-5,6	Oct. 11-Mar. 25
Lundsten, Lester Emanuel	B.E.1-1	July 12-Aug. 26
Lynam, James Matthew	B.E.1-1,2,3	July 12-Mar. 4
Lynch, Donald Christopher	B.E.1-1	July 12-Oct. 2
Lynn, Harry Wasdell, Jr.	B.E.-5E	Jan. 10-Feb. 14
Lyon, Glade Marvin	E.E.1-4,5	Oct. 11-Mar. 25
Maack, Herman Ralph	Ch.E.1-5,6	Oct. 11-Feb. 29

Name	*Curriculum and Term*	*Dates of Attendance*
MacDowell, Andrew Semple, Jr.	C.E.1-4A1	Oct. 11-Jan. 1
Macha, George Joseph	F.A.L.(G)-4,5,6	July 12-Mar. 25
MacInnes, Hugh, Jr.	M.E.1-4A1,4,5	July 12-Mar. 25
MacIver, John	B.E.1-1,2	Oct. 11-Mar. 25
Mack, William Bernard	M.E.1-4A1,4	Oct. 11-Mar. 25
MacLeod, Duncan Andrew	B.E.1-1,2	Oct. 11-Feb. 5
MacMillan, Richard Varhum	Ch.E.1-4A1,4	July 12-Jan. 1
*MacRae, Lan Findlay	B.E.1-1	Oct. 11-Jan. 1
*Madar, Michael Edward	B.E.1-1	Jan. 10-Mar. 4
Madsen, Stanley Walter	M.E.1-4,5	Oct. 11-Mar. 25
Mahoney, Dennis Curtis	F.A.L.(F)-4,5,6	July 12-Mar. 25
Malinowski, John Richard	M.E.1-4,5	Oct. 11-Mar. 25
*Mallin, Morton Lewis	B.E.1-1	Jan. 10-
Mallini, Harold Joseph	B.E.1-1,2	Oct. 11-Mar. 25
Malone, LeRoy William	B.E.1-1,2B	July 12-Jan. 1
Manke, George	B.E.1-1,2	July 12-Jan. 1
Mandelberg, Joseph	M.E.1-4,5,6	July 12-Mar. 25
Mannheimer, Harold Francis	M.E.1-4,5	Oct. 11-Mar. 25
Manning, Dyde	B.E.1-1,2	Oct. 11-Mar. 25
Mannion, Lawrence Edward	E.E.1-4,5	Oct. 11-Mar. 25
Marcos, Mike	B.E.1-1	Oct. 11-Jan. 1
*Marcus, Harold	B.E.1-1,2	Oct. 11-
Markey, Robert Henry	B.E.1-1	July 12-Aug. 26
Markle, James Adrian	B.E.1-1,2,3	July 12-Mar. 25
Marsden, Phillips Brooks, Jr.	B.E.-5E	Jan. 10-Feb. 14
Marsh, Robert Leslie	B.E.1-1,2B	Oct. 11-Mar. 25
Marshall, Cary Hayward	B.E.2-1,2	Oct. 11-Mar. 25
Martin, Albert Edward, Jr.	B.E.1-1	Oct. 11-Jan. 1
Martin, Donald S.	E.E.1-4,5	Oct. 11-Mar. 25
Martin, Ernest Carl	B.E.1-1	July 12-Oct. 2
Martin, Gomer Eugene	B.E.1-1,2	July 12-Jan. 1
Martin, John Wilfred	B.E.1-1	July 12-Sept. 25
*Martin, Kenneth Comp	B.E.1-1	Jan. 10-
Martin, Richard Dennis	B.E.1-1,2,3	July 12-Mar. 25
*Martin, Robert John	B.E.1-1	Jan. 10-Mar. 4
Martin, Walter F.	B.E.1-1	Oct. 11-Oct. 16
Martucci, Vincent Louis	F.A.L.(F)-4,5,6	July 12-Mar. 25
Martyn, John Gilbert	Ch.E.1-4,5,6	July 12-Mar. 25
Marusich, Robert John	B.E.1-1,2	July 12-Jan. 1
Masny, Maceslaus Joseph	B.E.1-1,2	July 12-Jan. 1
Mason, Louis Edward	B.E.1-1	Oct. 11-Jan. 1
Matheny, Richard Dale	F.A.L.(F)-4,5,6	July 12-Mar. 25
Matheson, Fred Akin	B.E.1-1,2B	July 12-Jan. 1
Mathews, John Bradburn	B.E.1-1	July 12-Aug. 25
Matson, Clifford H., Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Mattila, Henry William	B.E.1-1,2,3	July 12-Mar. 25
Matze, Edward Luther	B.E.1-1	July 12-Sept. 25
Maupin, Walter Anderson	M.E.1-4,5,6	July 12-Mar. 25
Maurer, Ernest Edward	B.E.1-1,2B	Oct. 11-Mar. 25
Maus, Louis, Jr.	Ch.E.1-4,5,6	July 12-Mar. 25
Mayer, Theodore Joseph	B.E.1-1	July 12-Oct. 2
Mayo, Jonathan Rex	B.E.1-1	July 12-Oct. 2
Mays, Robert Kenneth	B.E.1-1,2	Oct. 11-Mar. 25
Mazur, Lester David	B.E.-5E	Jan. 10-Feb. 14

Name	*Curriculum and Term*	*Dates of Attendance*
Mazzei, Joseph Dominic	F.A.L.(F)-4,5	July 12-Jan. 1
McAdams, Frank A., Jr.	F.A.L.(F)-4,5,6	July 12-Mar. 25
McAllister, Harry Tucker, Jr.	B.E.1-1,2B,3B	July 12-Mar. 25
McBride, Bertram Malcolm	F.A.L.(G)-4,5,6	July 12-Mar. 25
*McCall, John Marshall	B.E.1-1	Jan. 10-
McCallig, Edward Hatton	B.E.1-1,2,3	July 12-Mar. 14
McCaskil, William Eldred	C.E.1-4A1	July 12-Oct. 2
McCauley, Albert Pryibil, Jr.	M.E.1-4A1	Oct. 11-Jan. 1
McClain, William Granville	B.E.1-1,2	July 12-Jan. 1
McClelland, Warren Lester	C.E.1-4A1	Oct. 11-Jan. 1
*McClernan, Ralph Albert	B.E.1-1	Jan. 10-
McClure, Jesse Eugene	B.E.1-1,2	July 12-Jan. 1
McCoig, Leonard Mitchell	B.E.1-1,2	July 12-Jan. 1
McConnell, Edwin John	M.E.1-4A1,4,5	July 12-Mar. 25
McCoy, Ronald Wallace	B.E.1-1,2	July 12-Jan. 1
McCullough, Thomas Francis	E.E.1-4,5	Oct. 11-Mar. 25
McCusker, Hugh James	E.E.1-4A1;A.E.S3-4	Oct. 11-Mar. 25
McDivitt, Calvin Frank, Jr.	B.E.1-1,2B,3B	July 12-Mar. 4
McDonagh, Austin Joseph	B.E.1-1	Oct. 11-Jan. 1
McDonald, Norvel August	B.E.1-1,2	July 12-Jan. 1
McDonald, William Arnold	M.E.1-4,5,6	July 12 Mar. 25
*McDonnell, Dennis Thomas, Jr.	B.E.1-1	Jan. 10-Mar. 4
McEvoy, William Paul	M.E.1-4,5,6	July 12-Mar. 25
McFarland, Harry Warren	B.E.1-1,2	Oct. 11-Mar. 4
McFarlin, John Thomas	B.E.1-1,2	July 12-Jan. 1
*McGeever, Andrew Richard	B.E.1-1	Jan. 10-
McGiffin, Donald Wood	Ch.E.1-4A1; M.E.1-4,5	July 12-Mar. 4
*McGinnes, Edgar Allan, Jr.	B.E.1-1	Jan. 10-
McHale, Michael James	F.A.L.(G)-4,5,6	July 12-Mar. 25
McIntosh, Robert Wanzer	B.E.1-1,2B	July 12-Jan. 1
McKain, Richard Franklin	B.E.1-1	July 12-Oct. 2
McKitrick, Joseph Patrick	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
McLaughlin, John Creswell	B.E.1-1	Oct. 11-Jan. 1
McLaurine, Robert John	B.E.1-1,2,3	July 12-Mar. 4
McNamara, James Francis	B.E.1-2	Oct. 11-Jan. 1
McNamara, John Joseph	B.E.1-1	Oct. 11-Dec. 3
McNaughton, John Rusell	B.E.1-1	July 12-Oct. 2
McNelis, James Isadore	M.E.1-4,5,6	July 12-Mar. 25
McNew, Claude Cecil, Jr.	M.E.1-4A1	July 12-July24
McWilliams, James Patrick	F.A.L.(F)-4,5,6	July 12-Mar. 25
Mecklem, William Millard	C.E.1-4A1,4,5	July 12-Mar. 25
Meehan, John Francis	B.E.1-1,2B	July 12-Jan. 1
Meesig, Robert Joseph	B.E.1-1,2	July 12-Jan. 1
Meeve, Jack Elden	B.E.1-1,2B	Oct. 11-Mar. 4
Melchert, Edmund Charles	M.E.1-4A1	Oct. 11-Jan. 1
Merrick, Hollis Dwight	M.E.1-4A1,4,5	July 12-Mar. 25
Mesaros, Andrew Joseph	F.A.L.(G)-4	July 12-Oct. 2
Mestjian, Robert Aram	M.E.1-4A1,4,5	July 12-Mar. 2*
Metz, Jack Edmond	Ch.E1-4,5,6	July 12-Mar. 25
Meyer, Edward Herbert	E.E.1-4	Oct. 11-Jan. 1
Meyer, Francis Xavier	B.E.1-1,2	July 12-Jan. 1
Meyer, Fred Carl	B.E.1-1,2B	Oct. 11-Mar. 25
Meyer, George Wallace	M.E.1-5	Jan. 10-Feb. 14
Meyers, Kenneth Edsel	B.E.1-1,2B,3B	July 12-Mar. 4

Name	*Curriculum and Term*	*Dates of Attendance*
Michael, Donald William	B.E.1-1	July 12-Oct. 2
Michaels, Melvin Leonard	F.A.L.(G)-4,5,6	July 12-Mar. 25
Middleton, Edmund Bishop	B.E.1-1,2B,3B	July 12-Mar. 25
Midney, John Henry	M.E.1-5,6	Oct. 11-Mar. 25
Midyett, Marshall Hinton	B.E.1-1	July 12-Sept. 25
Mieczkowski, Thaddeus Richard	M.E.1-4A1	Oct. 11-Dec. 21
Miles, Harold Chester	B.E.1-1,2B	Oct. 11-Mar. 4
Miljour, Vernon Joseph	C.E.1-4A1,4,5	July 12-Mar. 25
Miller, Charles Wendell	B.E.1-1R,1,2	July 12-Mar. 25
Miller, Fred Barr	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
*Miller, Harry H.	B.E.1-1	Jan. 10-
Miller, Jack Leslie	B.E.-5E	Jan. 10-Feb. 14
Miller, John Francis	B.E.2-1,2	Oct. 11-Feb. 12
Miller, John Lucas	B.E.1-1,2B	Oct. 11-Mar. 25
Miller, John Vinton, Jr.	M.E.1-4A1; C.E.1-4,5	July 12-Mar. 25
Miller, Richard Maine	M.E.1-5,6	Oct. 11-Mar. 25
Miller, Robert Nevin	B.E.1-1,2	July 12-Dec. 21
Millican, Robroy	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Minkoff, Leo	B.E.1-1,2B,3B	July 12-Mar. 4
Miskill,Howard Philip	M.E.1-4A1,4	July 12-Jan. 1
Mitchell, John Richard	M.E.1-4,5	Oct. 11-Mar. 25
Mitman, Emil Francis	E.E.1-6	Jan. 10-Jan. 29
Mix, Louis Harlan	B.E.1-1	July 12-Aug. 26
Moglia, John Angelo	F.A.L.(F)-4,5,6	July 12-Mar. 25
Mohr, George Duane	B.E.1-1,2	Oct. 11-Mar. 4
Monaco, Herman Andrew	B.E.1-1,2B,3B	July 12-Mar. 25
Mondl, Adam John	M.E.1-5,6	Oct. 11-Mar. 25
Monoson, Harold	C.E.1-4A; A.E.S3-4	Oct. 11-Mar. 25
Moore, Francis James	B.E.2-1	Oct. 11-Jan. 1
Moore, Joe Grady, Jr.	B.E.1-1	Oct. 11-Jan. 1
Moore, Robert Raymond	B.E.1-1	Oct. 11-Jan. 1
Morgan, Jim Irving	B.E.1-1,2B	July 12-Jan. 1
Morgan, Norman Dean, Jr.	B.E.1-1,2	Oct. 11-Mar. 25
Morley, Paul John	B.E.1-1,2	Oct. 11-Feb. 2
Morrison, Raymond	B.E.1-1,2	July 12-Jan. 1
Morani, Arthur Thomas	M.E.1-4,5	Oct. 11-Mar. 25
Morris, Bernard Joseph	B.E.1-1,2	Oct. 11-Mar. 25
Morrison, John Herbert	M.E.1-4,5	Oct. 11-Mar. 25
Mortimore, Harold Edward	B.E.1-1,2B	July 12-Nov. 17
Mosby, Albert	B.E.1-1	July 12-Oct. 2
Moss, Walter Hamilton	M.E.1-4,5	Oct. 11-Mar. 25
Motsinger, Jack Eugene	B.E.1-1	Oct. 11-Dec. 3
Moulton, Richard Pierce	M.E.1-4	Oct. 11-Jan. 1
Mowery, Robert M.	B.E.1-1	Oct. 11-Dec. 3
Moyer, Robert Irving	M.E.1-4A1-4,5	July 12-Mar. 25
Muchnick, Charles	B.E.1-1	July 12-Oct. 2
Mulhollen, Donald Lee	B.E.1-1,2B	Oct. 11-Mar. 25
Mulkey, Robert Clare	B.E.1-1,2B,3B	July 12-Mar. 4
Mullen, Earl Francis	B.E.1-1,2	Oct. 11-Mar. 4
Muller, Francis Henry	E.E.1-4,5	Oct. 11-Mar. 25
Mungar, John Bryson	B.E.1-1,2	Oct. 11-Mar. 4
Munishor, Isaac Bernard	B.E.1-1,2B,3B	July 12-Mar. 25
Murphy, Edward Joseph	B.E.1-1	Oct. 11-Jan. 1
Myers, Charles Dawes	B.E.1-1	July 12-Oct. 2

Name	*Curriculum and Term*	*Dates of Attendance*
Myers, John Wayne	E.E.1-4,5	Oct. 11-Mar. 25
Myers, Paul Harold	B.E.1-1,2	July 12-Jan. 1
Nargizian, Andrew Antranig	Ch.E.1-4,5,6	July 12-Mar. 25
Nash, Frank Henry	C.E.1-4A1,4,5	July 12-Mar. 25
*Nave, Don Odell	B.E.1-1,2	Oct. 11-
Neakrans, Richard Edward	B.E.1-1	Oct. 11-Nov. 15
Nelson, Leroy Carl	B.E.1-1	July 12-Aug. 26
Nelson, Leroy L.	B.E.1-1	July 12-Oct. 2
Nelson, Paul Edward	B.E.1-1,2B,3B	July 12-Feb. 24
Neuger, Stanley Maurice	M.E.1-4A1;A.E.S3-4	Oct. 11-Mar. 25
Neureuter, Howard Raymond	B.E.-5E	Jan. 10-Feb. 14
Neville, Joseph	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Newcomb, Harrison George, Jr.	B.E.1-1	July 12-Oct. 2
Newcomer, Walter Lowrie	F.A.L.(G)-4,5,6	July 12-Mar. 25
Newell, Robert Daniel	B.E.1-1,2	July 12-Jan. 1
Newman, James Rogers	B.E.1-1,2,3	July 12-Feb. 12
Newman, Robert Smith	M.E.1-4	July 12-Oct. 2
Nicholaus, Louis John	B.E.1-1,2B	Oct. 11-Mar. 25
Nielsen, Peter Lassen, Jr.	B.E.1-1,2B,3B	July 12-Mar. 4
Niemond, Kenneth S.	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Nies, George Karlos	B.E.1-1,2B,3B	July 12-Feb. 24
Nieser, Richard Donald	C.E.1-4A1	Oct. 11-Jan. 1
Nikander, Klaus Henry	M.E.1-4A1,4,5	July 12-Mar. 25
Noah, James Karl, Jr.	B.E.1-1,2	July 12-Jan. 1
Nobleman, Eli E.	F.A.L.(G)-4,5,6	July 12-Feb. 29
Nolan, William Edward	B.E.1-1	July 12-Sept. 25
Noneman, James Edward	B.E.1-1,2,3	July 12-Mar. 25
Noon, Raymond Thomas	B.E.1-1,2,3	July 12-Mar. 4
Noonan, John DeWayne	M.E.1-4,5	Oct. 11-Mar. 25
Nordli, Robert Leroy	B.E.1-1,2,3	July 12-Mar. 25
Noreika, Albert William	B.E.1-1,2,3	July 12-Mar. 4
Norris, Howard Frank	B.E.1-1	July 12-Aug. 26
Nosoff, Norman	B.E.1-1,2B	Oct. 11-Mar. 25
Notson, Robert Virgil	B.E.1-1,2	Oct. 11-Mar. 25
Nugent, George Lester	Ch.E.1-4A1	July 12-Aug. 27
Nurick, Milton Louis	C.E.1-4A1,4,5	July 12-Mar. 25
Nussbaum, Marvin Lee	B.E.1-1,2,3	July 12-Mar. 25
*O'Brien, Michael Edward	B.E.1-1	Jan. 10-Mar. 4
O'Brien, William Francis	F.A.L.(G)-4,5,6	July 12-Mar. 25
O'Bryan, Andrew Joseph	B.E.1-1R	July 12-Sept. 25
Occhipint, Constantine John	F.A.L.(F)-4,5	July 12-Jan. 1
O'Connor, William James	C.E.1-4A1,4	July 12-Jan. 1
Odegard, Holtan Peter	Ch.E.1-4,5,6	July 12-Mar. 25
O'Donnell, Francis John	B.E.1-1	July 12-Oct. 2
*O'Donnell, Joseph Gerard	B.E.1-1	Oct. 11-Jan. 1
O'Grady, Norman John	E.E.1-5,6	Oct. 11-Mar. 25
Ohrynowicz, Casimir Martin	F.A.L.(G)-4,5,6	July 12-Feb. 14
Okun, Herbert Myron	M.E.1-5,6	Oct. 11-Mar. 25
O'Leary, John Lawrence	B.E.1-1,2B,3B	July 12-Mar. 25
Olerud, Paul Luverne	B.E.1-1R,1,2	July 12-Mar. 4
Oleson, Gardner Richard	B.E.1-1,2B,3B	July 12-Mar. 4
Olf, Milton	B.E.1-1,2,3	July 12-Mar. 25
Oliva, Charles Leonard	B.E.1-1	July 12-Sept. 25
Olivadoti, Peter Paul	M.E.1-4,5	Oct. 11-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Olmsted, Charles Henry	F.A.L.(G)-4,5,6	July 12-Mar. 25
Olshansky, David	B.E.1-1,2B,3B	July 12-Mar. 25
Olson, Raymond Sharppe	B.E.1-1,2B	July 12-Jan. 1
Olson, Robert Edward	B.E.1-1,2	Oct. 11-Mar. 4
O'Malley, John Joseph, Jr.	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
O'Neill, John Joseph	B.E.1-1	July 12-Sept. 25
Ooton, Scottie Eldon	B.E.1-1,2,3	July 12-Mar. 25
*Opel, Donald E.	B.E.1-1	Oct. 11-Jan. 1
Oram, Sidney Jay	F.A.L.(G)-4,5,6	July 12-Mar. 25
Orlebeke, Howard Peter	M.E.1-5,6	Oct. 11-Mar. 25
*Orndorf, James Frederick	B.E.1-1	Jan. 10-
Orpe, Frank Jerome	F.A.L.(G)-4,5,6	July 12-Mar. 25
Orth, Carlton Arthur	C.E.1-4A1	July 12-Oct. 2
Orthner, Wilbur Philip	B.E.1-1; B.E.2-1	July 12-Dec. 4
Otto, Forrest Reno	B.E.1-1,2B,3B	July 12-Mar. 25
Overholt, Donald Curtis	Ch.E.1-4,5,6	July 12-Mar. 25
Oviatt, Willard Dean	B.E.1-1,2	Oct. 11-Mar. 4
Owen, David Evan, Jr.	B.E.1-1	Oct. 11-Jan. 1
Owen, Robert William	Ch.E.1-4	July 12-Oct. 2
Owens, Paul Elliot	C.E.1-4A1,4,5	July 12-Mar. 25
Owens, Warren Doyle	B.E.1-1,2B,3B	July 12-Mar. 25
Oyster, Sterling Russell	B.E.1-1,2B	July 12-Jan. 1
Packard, Calvin Ells	B.E.1-1	Oct. 11-Jan. 1
Palmer, Earle Hollis, Jr.	B.E.1-1	July 12-Aug. 26
Pantell, James William	M.E.1-4,5	Oct. 11-Mar. 25
Papacosta, Constantine George	M.E.1-4,5	Oct. 11-Mar. 25
Papp, Robert Richard	M.E.1-4,5,6	July 12-Mar. 25
Pappas, Nicholas Christopher	B.E.1-1	Oct. 11-Jan. 1
Pardue, William Sherman, Jr.	B.E.1-1	July 12-Sept. 25
Parfimowicz, Boleslaus Felix	C.E.1-4A1; A.E.S3-4	Oct. 11-Feb. 9
Parker, Carl Freeman	B.E.1-1,2B,3B	July 12-Mar. 25
*Parker, Thorburn Abbit	B.E.1-1	Jan. 10-
Parks, Albert Raymond	Ch.E.1-4A1,4	July 12-Jan. 1
Parmelee, George Wyman	Ch.E1-4A1; C.E.1-4,5	July 12-Mar. 25
Parnass, Norman	B.E.1-1,2B,3B	July 12-Mar. 25
Pascucci, Robert Philip	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Pasher, William Vedal	E.E.1-4,5	Oct. 11-Mar. 25
Pass, John Francis	B.E.1-1	July 12-Oct. 2
Pate, Clarence Arkell	B.E.1-1,2B	Oct. 11-Mar. 25
Patrick, Phillip Orin	Ch.E.1-4,5,6	July 12-Mar. 25
Patterson, Herman Cecil	B.E.1-1,2	July 12-Jan. 1
*Patterson, Lloyd M.	B.E.1-1	Oct. 11-Jan. 1
Patton, Benjamin Joseph	E.E.1-5,6	Oct. 11-Mar. 25
Paules, John Guilford	B.E.1-1,2B	Oct. 11-Mar. 25
Paulsen, James Miller III	B.E.1-1,2	July 12-Jan. 1
Payne, Claude Warren	B.E.1-1,2B,3B	July 12-Mar. 25
Payne, Wilbur Charles	C.E.1-4A1,4	July 12-Jan. 1
Pearl, George Clayton	B.E.1-1,2	July 12-Jan. 1
Pearson, George Gordon	M.E.1-4,5	Oct. 11-Mar. 25
Peck, Charles Fletcher	M.E.1-4A1,4	July 12-Jan. 1
Pender, James Brechen	C.E.1-4A1,4,5	July 12-Mar. 25
Pendergast, Edward Leonard	B.E.1-1	July 12-Aug. 26
Pendelton, Edmund Elliott	E.E.1-4A1,4,5	July 12-Mar. 25
Penick, Groff Landis	M.E.1-4A1,4	July 12-Jan. 1

Name	*Curriculum and Term*	*Dates of Attendance*
Penning, Robert Donald	E.E.1-4,5	Oct. 11-Mar. 25
Pennock, John Carroll	M.E.1-4,5,6	July 12-Mar. 25
Perkins, Walter George	B.E.1-1R	July 12-Sept. 25
*Perlman, Clifford	B.E.1-1	Jan. 10-
Perry, Daniel Richard	B.E.1-1,2	Oct. 11-Feb. 9
Perry, John Mack	B.E.1-1	July 12-Oct. 2
Perry, Pasqual Clifford	E.E.1-4A1,4,5	July 12-Mar. 25
Peterson, Lloyd C.	B.E.1-1	Oct. 11-Oct. 16
Peterson, Robert Kenneth	Ch.E.1-4A1;E.E.1-4,5	July 12-Mar. 25
Petrisek, Adam	B.E.1-1,2B	Oct. 11-Mar. 25
Petrone, John James	B.E.1-1,2B,3B	July 12-Mar. 25
Petru, Henry Augustine	B.E.1-1,2	July 12-Jan. 1
Pew, Frank William	B.E.1-1,2B,3B	July 12-Mar. 25
Pfaff, John Gilbert, Jr.	B.E.1-1	Oct. 11-Jan. 1
*Pfeiffer, Richard McFarland	B.E.1-1	Oct. 11-Jan. 1
Philley, Larry Edwin	B.E.1-1,2,3	July 12-Mar. 4
Piras, Herbert Michael	B.E.1-1	Oct. 11-Jan. 1
Pirone, Alfred Daniel	E.E.1-4,5	Oct. 11-Mar. 25
Plocich, Joseph Paul	B.E.2-1	Oct. 11-Jan. 1
Poganski, Victor John	B.E.1-1	July 12-Sept. 25
Pohlman, Donald Frederick	M.E.1-5,6	Oct. 11-Mar. 25
Pollard, Lynwood Earl	B.E.1-1,2	July 12-Dec. 3
Pollock, William Robert	B.E.1-1,2,3	July 12-Mar. 25
Poppe, Harvey John	B.E.1-1,2B	Oct. 11-Mar. 25
Powell, Paul	M.E.1-4	Oct. 11-Jan. 1
Powell, Sinclair	B.E.1-1,2B	Oct. 11-Mar. 25
Powers, Thomas Francis	M.E.1-4A1	July 12-Oct. 2
Prather, Harold Cassingham	E.E.1-5,6	Oct. 11-Feb. 9
Prekowitz, Theodore Edward	F.A.L.(G)-4,5,6	July 12-Mar. 25
Prince, Philip Hudson	M.E.1-4,5	Oct. 11-Mar. 25
Printup, William Otway	M.E.1-4,5,6	July 12-Mar. 25
Provis, William Harold	B.E.1-1,2	July 12-Jan. 1
Pryschiller, Daniel	B.E.1-1,2	Oct. 11-Mar. 4
*Pseny, Herman Raphael	B.E.1-1	Oct. 11-Jan. 1
Pugh, Eugene Clem	B.E.1-1,2B	Oct. 11-Mar. 25
Purcell, Edward Francis	B.E.1-1,2B,3B	July 12-Mar. 25
Purdey, Edward John	B.E.1-1,2B,3B	July 12-Mar. 25
Quesnell, Arthur Thomas	B.E.1-1	July 12-Sept. 25
Quinlan, Maurice James	F.A.L.(G)-4,5,6	July 12-Mar. 25
*Quintin, Walter Pfister, Jr.	B.E.1-1	Jan. 10-
Raab, Herbert George	F.A.L.(G)-4	July 12-Oct. 2
Rabin, Bernard	B.E.1-1,2B,3B	July 12-Mar. 25
Rachofsky, Robert Curtis	B.E.1-1,2	Oct. 11-Mar. 25
Rackham, Warren Don	M.E.1-4A1	July 12-Sept. 25
Rafert, Everett Alton	E.E.1-5,6	Oct. 11-Mar. 25
Rahm, LeRoy Eugene	M.E.1-4A1,4,5	July 12-Mar. 25
*Rahter, Paul Donald	B.E.1-1,2	Oct. 11-
Rakowski, Adam Jerome	B.E.1-1,2,3	July 12-Mar. 25
Ramatowski, Chester John	M.E.1-4,5,6	July 12-Mar. 25
Ramey, Fred A., Jr.	B.E.1-1,2B,3B	July 12-Mar. 25
Ramsey, J. R.	B.E.1-1,2B,3B	July 12-Mar. 25
Rankin, John Bruce	E.E.1-4,5	Oct. 11-Mar. 25
Ravizza, Ermano John	B.E.1-1,2B	Oct. 11-Mar. 25
Read, Emery R.	C.E.1-4A1,4,5	July 12-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Rechkemmer, John Finch	B.E.1-1,2B,3B	July 12-Jan. 21
Recor, Oscar Melvin	B.E.1-1,2	July 12-Jan. 1
Redfearn, Frederick William	B.E.2-1,2	Oct. 11-Mar. 25
*Redington, Paul Graham	B.E.1-1	Jan. 10-
Redman, Charles George	M.E.1-4A1,4	July 12-Dec. 3
*Reich, Mayer Samuel	B.E.1-1	Jan. 10-
Reid, Robert Storrs	B.E.1-1,2	Oct. 11-Mar. 25
Renz, Edward James	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Resseguie, Wendell Keith	B.E.1-1,2B,3B	July 12-Mar. 25
Revoir, William Henry, Jr.	Ch.E.1-4,5,6	July 12-Mar. 25
Rezin, Daniel Bruce	B.E.1-1	July 12-Sept. 25
Ricard, Guy Raymond	F.A.L.(G)-4;F.-5	July 12-Jan. 1
Rice, Donald Martin	B.E.1-1,2B,3B	July 12-Mar. 25
Riccitelli, Joseph Vincent	B.E.2-1,2	Oct. 11-Mar. 25
Richards, William Shelley	E.E.1-4,5	Oct. 11-Mar. 25
Richardson, Andrew	M.E.1-4A1	Oct. 11-Jan. 1
Reimer, Marvin Francis	Ch.E.1-4,5,6	July 12-Mar. 25
Rine, William Sedic	B.E.1-1	Oct. 11-Jan. 1
Ringel, Samuel Marcus	E.E.1-4,5	Oct. 11-Mar. 25
Rippel, Charles Willard, Jr.	B.E.1-1,2	Oct. 11-Mar. 25
Risher, Robert Remick, Jr.	B.E.1-1,2	Oct. 11-Mar. 25
Rissler, John Walter	B.E.1-1,2B	July 12-Jan. 1
Riske, Roy Martin	B.E.1-1	July 12-Sept. 25
Rister, Wilford Clyde	B.E.1-1,2B,3B	July 12-Mar. 25
Riter, James Francis	B.E.1-1	Oct. 11-Jan. 1
Ritsky, Anthony Francis	B.E.1-1,2	July 12-Jan. 1
Rivers, Charles Edwin, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Rives, James Barry	B.E.1-1,2B	Oct. 11-Mar. 25
Roach, James Joseph	B.E.1-1	Oct. 11-Dec. 13
Robas, John Stoddard	C.E.1-4A1,4,5	July 12-Mar. 25
Robba, Charles Reginald	M.E.1-4,5,6	July 12-Mar. 25
Robbins, Donald Eugene	B.E.1-1	July 12-Oct. 2
Roberts, Dean Allen	B.E.1-1	Oct. 11-Jan. 1
Roberts, Donald Owen	B.E.1-1,2B	Oct. 11-Mar. 25
Robertson, Arthur Eugene	B.E.1-1,2B,3B	July 12-Mar. 25
Robida, Leo Emile	F.A.L.(G)-4,5,6	July 12-Feb. 14
Robinson, Alfred F.	B.E.2-1	Oct. 11-Dec. 4
Robinson, Kenneth Owen	E.E.1,4,5	Oct. 11-Mar. 25
*Robinson, Patrick Robert	B.E.1-1	Jan. 10-Mar. 4
Robson, Horace Thomas	M.E.1-4,5	Oct. 11-Mar. 25
Rochester, Stephen Ratcliffe	M.E.1-5	Jan. 10-Feb. 14
Rockowitz, Jerome Bernard	B.E.1-1,2,3	July 12-Mar. 25
Rodio, Julio	B.E.1-1,2	Oct. 11-Mar. 25
Rodler, Joseph John	F.A.L.(G)-4	July 12-Oct. 2
Roe, Jimmie	B.E.2-1,2	Oct. 11-Feb. 9
Rogers, Sidney	M.E.1-4A1,4	July 12-Jan. 1
Roggenkamp, LeRoy Phillip	B.E.1-1,2B	Oct. 11-Mar. 25
Rogness, John Alden	B.E.1-1,2	Oct. 11-Mar. 25
Ronan, Harold Ramp	B.E.1-1,2	Oct. 11-Mar. 25
Ronk, Herbert Beecher	B.E.1-1,2B	Oct. 11-Mar. 25
Rosati, Patsy	B.E.1-1	July 12-Oct. 2
Roscoe, Gene George	B.E.1-1	Oct. 11-Jan. 1
Rose, Emery Byron	B.E.1-1	July 12-Sept. 25
*Rosen, Morton	B.E.1-1	Jan. 10-

Name	*Curriculum and Term*	*Dates of Attendance*
Rosenbarker, Irving E.	E.E.1-5,6	Oct. 11-Mar. 25
Rosenbluth, Leo	M.E.1-4,5	Oct. 11-Mar. 25
Rosener, Alfred Lincoln, Jr.	Ch.E.1-6	Jan. 10-Feb. 14
Rosenfeld, Robert Russell	M.E.1-4,5	Oct. 11-Mar.25
Rosik, Robert, Jr.	B.E.2-1,2	Oct. 11-Mar.25
Ross, Philmore	E.E.1-4A1,4,5	July 12-Mar. 25
Rossi, Felix John	B.E.2-1,2	Oct. 11-Feb. 9
Rothblut, Hymen R.	B.E.1-1,2,3	July 12-Mar. 25
Rotheiser, Norman	B.E.1-1,2B,3B	July 12-Mar. 25
Rowley, Charles Edward	Ch.E.1-4A1;E.E.1-4,5	July 12-Mar. 25
Rowley, Forrest Luverne	B.E.1-1	July 12-Aug. 26
Rowntree, Carl Bearden, Jr.	Ch.E.1-4A1; E.E.1-4,5	July 12-Mar. 3
Roy, Paul Eugene	B.E.1-1	July 12-Oct. 2
Rozalsky, Irving	M.E.1-4,5	Oct. 11-Mar. 25
Rozell, Franklin Warren	B.E.1-1,2B,3B	July 12-Mar. 25
*Rubenstein, Martin Julius	B.E.1-1	Jan. 10-
Rubin, Melvin Stanley	M.E.1-5,6	Oct. 11-Mar. 25
Rudow, Donald Wendell	B.E.1-1,2B	Oct. 11-Mar. 25
Rudy, Dale Joseph	B.E.1-1	Oct. 11-Jan. 1
Rudy, David	F.A.L.(G)-4,5,6	July 12-Feb. 29
Rudzinski, Marcel A.	F.A.L.(G)-4,5,6	July 12-Mar. 25
Rufle, Albert William	M.E.1-4A1,4,5	July 12-Mar. 25
Ruh, Richard Anthony	B.E.1-1,2B,3B	July 12-Mar. 25
Rumbaugh, Frank Howard	C.E.1-4A1	Oct. 11-Jan. 1
Rump, Ellis Samuel, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Rundlett, John Scheaffer, Jr.	B.E.1-1,2B	July 12-Jan. 1
Russell, Philip Hunt, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Rylde, Joseph Arthur, Jr.	C.E.1-4,5	Oct. 11-Mar. 25
Sachs, Irving Joseph	B.E.1-1,2B	Oct. 11-Feb. 9
Sachsel, Joseph Morris	E.E.1-4A1	Oct. 11-Jan. 1
Sahagun, Mario Armando	B.E.1-1	July 12-Aug. 26
St. John, Fordyce Barker, Jr.	C.E.1-4A1,4,5	July 12-Mar. 25
St. Martin, John Thomas	B.E.1-1,2,3	July 12-Mar. 25
Saling, James Hirshel	B.E.1-1	July 12-Oct. 2
Salva, Milan Elmer, Jr.	C.E.1-4A1,4,5	July 12-Mar. 25
*Sample, James Albert	B.E.1-1,2	Oct. 11-
Sanderford, Maxwell Monroe, Jr.	B.E.1-1,2B	Oct. 11-Mar. 25
Sangermano, Neil Andrew	B.E.1-1,2B	Oct. 11-Feb. 9
Satterlee, John Hayzlett	B.E.1-1,2B,3B	July 12-Mar. 10
Saul, Sidney R.	C.E.1-4A1,4	July 12-Jan. 1
Saunders, Bill Graves	B.E.1-1,2B	Oct. 11-Mar. 25
Savadove, Sylvan Harold	B.E.1-1	Oct. 11-Jan. 1
Sawyer, Paul Barton	B.E.1-2	Oct. 11-Jan. 1
Scanlan, James Michael Taylor	M.E.1-4A1,4,5	July 12-Mar. 25
Scheele, Wilbur Gregory	B.E.1-1	July 12-Oct. 2
Schellentrager, Edwin Richard	M.E.1-5,6	Oct. 11-Mar. 25
Scherer, John Michael	B.E.1-1,2,3	July 12-Mar. 25
Schiebler, Klaus G.	B.E.1-1	Oct. 11-Jan. 1
*Schlicht, Charles Joseph	B.E.1-1	Jan. 10-
Schmidt, August Emil, Jr.	B.E.1-1,2	July 12-Jan. 1
Schmidt, Elmer Albert	B.E.1-1	Oct. 11-Jan. 1
Schneider, Arno Karl	B.E.1-1	Oct. 11-Jan. 1
Schneider, George Alfred Caspar	M.E.1-4,5	Oct. 11-Mar. 25
Schneider, Morris Nathan	E.E.1-4,5	Oct. 11-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Schoch, Richard Luther	B.E.-5E	Jan.10-Feb. 14
*Schock, Leonard Oaks	B.E.1-1	Jan. 10-Feb. 12
Schoen, John Arthur	C.E.1-4A1,4	July 12-Jan. 27
Scholan, William John	M.E.1-4,5,6	July 12-Mar. 25
Schork, Donald Everett	B.E.1-1,2B,3B	July 12-Mar. 25
Schrader, Frank Joseph	B.E.1-1,2B	Oct. 11-Mar. 25
Schram, Irwin Herbert, Jr.	Ch.E.1-5,6	Oct. 11-Feb. 29
Schreier, Nathan	B.E.1-1,2	Oct. 11-Mar. 25
Schubert, Edward Alvin	B.E.1-1	Oct. 11-Jan. 1
Schulz, Elmer Richard	B.E.1-1,2B	Oct. 11-Mar. 25
Schulze, Lester Raverlyn	B.E.1-1,2B	Oct. 11-Feb. 9
*Schwab, Albert Leon	B.E.1-1	Jan. 10-
Schwab, Alvin Robert	B.E.1-1,2	July 12-Jan. 1
Schwartz, Saul Dulfon	E.E.1-4,5	Oct. 11-Mar. 25
Schwarz, Frederick	F.A.L.(G)-4,5,6	July 12-Mar. 25
Schwarz, Mark Herman, Jr.	B.E.-5E	Jan. 10-Feb. 14
Scobey, David Phineas	F.A.L.(G)-5,6	Oct. 11-Feb. 14
*Scollon, Robert W., Jr.	B.E.1-1	Oct. 11-Jan. 1
Scott, Delmore Eugene	B.E.1-1,2B,3B	July 12-Mar. 25
Scott, Dwain Lewis	B.E.1-1,2	Oct. 11-Mar. 25
Scott, Robert James	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Scutella, Pasqula Joseph	E.E.1-5,6	Oct. 11-Mar. 25
Seales, William Taylor	M.E.1-4,5	Oct. 11-Mar. 25
Seaman, Joseph Alonzo	B.E.1-1,2B,3B	July 12-Mar. 4
Secunda, William J.	E.E.1-4A1;A.E.S3-4	Oct. 11-Mar. 4
Seegmiller, Edward Clark	B.E.1-1,2B	Oct. 11-Mar. 25
Seely, Charles Lewis	C.E.1-4,5	Oct. 11-Mar. 25
Segelhorst, Norbert Elmer	B.E.1-1,2,3	July 12-Mar. 25
*Seibert, Edward Harry	B.E.1-1	Jan. 10-
Seifert, Charles Edward, Jr.	M.E.1-5,6	Oct. 11-Mar. 25
Seiferth, Russell John	B.E.1-1,2	July 12-Jan. 1
Seiger, Donald Paul	B.E.1-1	Oct. 11-Jan. 1
Seitz, Carl Rudolph	M.E.1-5,6	Oct. 11-Mar. 25
Seltzer, Herman	B.E.2-1,2	Oct. 11-Feb. 9
Seltzer, Jack	B.E.1-1,2,3	July 12-Mar. 25
Semmel, Thomas Henry	B.E.-5E	July 10-Mar.4
Senyard, Charles Earl	C.E.1-4A1	July 12-Aug. 26
Sepella, John Michael	F.A.L.(G)-4,5,6	July 12-Mar. 25
Shackleton, Gordon Albert	B.E.1-1	July 12-Sept. 25
Shafer, Maurice Thomas	B.E.1-1R,1	July 12-Jan. 1
Shaginaw, Peter Paul	F.A.L.(G)-4,5,6	July 12-Mar. 25
Shanahan, David Mark	B.E.1-1,2	July 12-Jan. 1
Shands, Carol Alvin	M.E.1-4A1,4,5	July 12-Mar. 25
Shapiro, Irvin	B.E.1-1,2,3	July 12-Mar. 25
Shapiro, Stanley Robert	B.E.1-1	Oct. 11-Jan. 1
Shaunessy, John Emerson	B.E.1-1,2B	Oct. 11-Mar. 25
Shaw, Eldon Bernard	B.E.1-1,2B,3B	July 12-Feb. 9
Shea, Edward Thomas	E.E.1-5,6	Oct. 11-Mar. 25
Sheehan, Timothy Joseph	B.E.1-1	Oct.11-Jan. 1
Shell, James William	B.E.1-1,2	July 12-Dec. 3
Shelley, Carl Thomas	M.E.1-4A1,4	July 12-Jan. 1
Sherman, John Harvey, Jr.	E.E.1-5,6	Oct. 11-Mar. 25
Sherrard, Jacob Henderson, Jr.	B.E.1-1	Oct. 11-Jan. 1
Shetley, Rhoten Nathan	F.A.L.(G)-4	July 12-Aug. 26

Name	*Curriculum and Term*	*Dates of Attendance*
Shively, George Edgar	B.E.1-1	July 12-Sept. 25
Shivers, John Day	B.E.2-1	Oct. 11-Jan. 1
Shneiweiss, Ernest	B.E.1-1,2B	Oct. 11-Mar. 29
Shoemaker, Leslie Bernard	B.E.1-1,2B,3B	July 12-Mar. 25
Shryock, John Knight, Jr.	B.E.1-1	Oct. 11-Jan. 1
*Shtasel, Albert	B.E.1-1	Jan. 10-
Shulick, Louis J.	B.E.1-1	Oct. 11-Jan. 1
Shulman, Joseph	B.E.1-1,2B	Oct. 11-Mar. 25
*Shulman, William Joseph	B.E.1-1	Jan. 10-
Shutak, George David	B.E.1-1,2,3	July 12-Mar.4
Sickles, Harold Hubert	E.E.1-4	Oct. 11-Jan. 1
Siegel, David	M.E.1-4A1-A.E.S3-4	Oct. 11-Mar. 25
Siegel, Jordan Paul	B.E.1-1	Oct. 11-Jan. 1
Siegle, Robert Lee	B.E.1-1,2,3	July 12-Mar. 25
Siekemeyer, Richard Edward	C.E.1-4A1-A.E.S3-4	Oct. 11-Mar. 25
Siewert, Henry Barnholdt	B.E.1-1,2B	July 12-Jan. 1
Signore, Claude Michael	F.A.L.(F)-4,5,6	July 12-Mar. 25
Silk, Jerome Robbins	B.E.1-1	Oct. 11-Jan. 1
Silver, Charles	B.E.1-1	Oct. 11-Dec. 9
Silver, George David	Ch.E.1-4A1;C.E.1-4,5	July 12-Mar. 25
Silver, Howard	B.E.1-1,2B,3B	July 12-Mar. 25
Simm, Roy Wilbert	M.E.1-4,5	Oct. 11-Mar. 25
Simmons, Cary Fred	B.E.1-1	Oct. 11-Jan. 1
*Simmons, Richard Fessler II	B.E.1-1	Oct. 11-Jan. 1
Simpson, John Arol	E.E.1-6	Jan. 10-Mar. 25
Simpson, William Dale	B.E.1-1	Oct. 11-Dec. 12
Sims, John Warren	B.E.1-1,2B,3B	July 12-Mar. 4
Simson, Marvin	B.E.2-1,2	Oct. 11-Mar. 25
Singer, Harold David	Ch.E.1-4A1	July 12-Aug. 17
Sinowitz, Albert Harold	B.E.1-1,2B	Oct. 11-Feb. 9
Sitkiewicz, John Raymond	B.E.1-1	Oct. 11-Jan. 1
Sixsmith, John Thomas	M.E.1-4,5	Oct. 11-Mar. 25
Skaff, Irving William	M.E.1-4,5	Oct. 11-Mar. 25
Skarzynski, Alexander Theodore	E.E.1-4,5	Oct. 11-Mar. 25
Skeens, Robert Carl	B.E.1-1,2,3	July 12-Mar. 25
Skilling, John Morrision, Jr.	B.E.-5E	Jan. 10-Feb. 14
Skinner, George Arthur	E.E.1-4A1;C.E.1-4,5	July 12-Mar. 25
Skjegstad, Clifford Lloyd	B.E.1-1,2B,3B	July 12-Mar. 25
Skomp, James H.	M.E.1-4A1,4,5	July 12-Mar. 25
Skrbich, Michael James	B.E.1-1,2B,3B	July 12-Mar. 25
Slaght, Edgar Clive, Jr.	Ch.E.1-4,5,6	July 12-Mar. 25
Slaughenhoupt, Arnold C.	B.E.1-1	Oct. 11-Jan. 1
Slete, Robert William	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Slocumb, Theron Jacques	B.E.1-1,2B	Oct. 11-Mar. 25
Smith, Francis A.	B.E.1-1	Oct. 11-Oct. 16
Smith, George	E.E.1-4,5	Oct. 11-Mar. 25
Smith, Gordon Barron	B.E.1-1	July 12-Sept. 25
Smith, Horace Rayl	E.E.1-4,5	Oct. 11-Mar. 25
Smith, John H.	Ch.E.1-4A1; E.E.1-4,5	July 12-Mar. 6
Smith, Robert John	B.E.1-1,2	Oct. 11-Mar. 25
Smith, Ronald Drenning	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Smith, Siegmund Wilson	F.A.L.(F)-4,5	July 12-Jan. 1
Smith, Thornton Edward	M.E.1-5,6	Oct. 11-Mar. 25
Smith, Verity Carlisle	Ch.E.1-4,5,6	July 12-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Smith, William Victor	B.E.1-1,2B,3B	July 12-Mar. 25
Smith, Zane Revere	B.E.1-1,2	Oct. 11 Mar. 4
Smock, Lloyd Wilbur	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Smolinsky, Harold Jay	E.E.1-4,5	Oct. 11-Mar. 25
Snarr, John Raymond, Jr.	B.E.1-1	July 12-Sept. 25
*Sniderman, Milton	B.E.1-1	Jan. 10-
Snyder, Carl Heath, Jr.	M.E.1-4,5	Oct. 11-Mar. 25
Snyder, Edward LeRoy	B.E.1-1,2	July 12-Jan. 1
Snyder, Edward Martin	B.E.1-1,2B	Oct. 11-Feb. 9
Snyder, Glen Wilburt	B.E.1-1	Oct. 11-Jan. 1
Soba, Daniel Irving	Ch.E.1-4,5,6	July 12-Mar. 25
Sobel, Sanford Warner	C.E.1-4A1,4,5	July 12-Mar. 4
Sokolove, Leonard Bernard	B.E.1-1	Oct. 11-Jan. 1
Soliday, Phillip Duane	B.E.1-1	Oct. 11-Dec. 4
Solfisburg, Christian Harrison	M.E.1-4A1,4,5	July 12-Mar. 25
Sontag, Frederick Earl	B.E.1-1,2B	Oct. 11-Mar. 25
Soth, Robert Louren	E.E.1-4,5	Oct. 11-Mar. 25
South, Henry Charles	E.E.1-4A1,4,5	July 12-Mar. 25
Spallone, William Dominic	B.E.1-1,2B,3B	July 12-Mar. 25
Spanton, Lloyd Arthur	B.E.1-1	Oct. 11-Jan. 1
Speer, Edgar Francis	B.E.1-1,2B	Oct. 11-Feb. 9
Speser, David	M.E.1-4,5	Oct. 11-Mar. 25
Spewak, Morwell Maxwell	B.E.1-1	Oct. 11-Jan. 1
Spiegel, Walter Felix	M.E.1-5,6	Oct. 11-Mar. 25
Stack, Francis Joseph	B.E.1-1,2	Oct. 11-Feb. 8
Stah, Josaphat, Jr.	B.E.1-1	Oct. 11-Jan. 1
*Stahler, Melvin	B.E.1-1	Jan. 10-Mar. 4
Stanford, Leon Robert	B.E.1-1,2B	Oct. 11-Mar. 25
Stango, Constant	B.E.1-1	Oct. 11-Jan. 1
Stanley, Robert Wood	M.E.1-4A1,4,5	July 12-Mar. 25
Stanton, Eugene Richard	B.E.1-1,2B	Oct. 11-Mar. 25
Stark, Theodore	E.E.1-4A1,4,5	July 12-Mar. 4
Statman, Joseph Samuel	F.A.L.(F)-4,5,6	July 12-Mar. 25
Stecker, Charles Bates, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Steckhan, Donald Robert	B.E.2-1,2	Oct. 11-Feb. 9
Steffee, Richard Daniel	B.E.1-1	Oct. 11-Jan. 1
Stegman, Marvin Wayne	B.E.1-1,2B	Oct. 11-Mar. 25
*Stehman, Lee Knight	B.E.1-1	Oct. 11-Dec. 3
Stein, Edgar Beck	M.E.1-5,6	Oct. 11-Mar. 25
*Stein, Victor Phillie	B.E.1-1	Jan. 10-Feb. 12
Steiner, Richard Ray	E.E.1-4,5	Oct. 11-Mar.25
Stenecker, Robert G.	E.E.1-4A1,4,5	July 12-Mar. 25
Stephens, Francis Edward	E.E.1-4,5	Oct. 11-Mar. 25
Stephenson, Jacob William, Jr.	C.E.1-4A1,4,5	July 12-Mar. 25
Stevens, Murry Bert	B.E.1-1,2B	Oct. 11-Mar. 25
Stevens, Oscar William	F.A.L.(G)-4,5,6	July 12-Mar. 25
Stevens, Robert Christian	B.E.1-1,2B,3B	July 12-Mar. 25
Steward, George E.	B.E.1-1	Oct. 11-Jan. 1
Stewart, Alan Ball	B.E.1-1,2	Oct. 11-Mar. 4
Stickney, John William	B.E.1-1,2B	Oct. 11-Mar. 25
*Stitt, Richard Lee	B.E.1-1	Jan. 10-Feb. 12
Stockbridge, Bruce Wilmer	M.E.1-5,6	Oct. 11-Mar. 25
Stoddard, Philip Monroe	B.E.1-1,2B,3B	July 12-Mar. 25
Stoeberl, George Frank	B.E.1-1	Oct. 11-Dec. 4

Name	*Curriculum and Term*	*Dates of Attendance*
*Stolze, James Ralph	B.E.1-1	Oct. 11-Jan. 1
Storey, David Clark	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Storey, Frank Charles	B.E.1-1,2B,3B	July 12-Mar. 4
Stouffer, Marquis Francis	B.E.1-1,2B	July 12-Jan. 1
Strand, Robert Thore	B.E.1-1	Oct. 11-Jan. 1
Strandberg, Henry Raymond	B.E.1-1,2	July 12-Jan. 1
Strandford, John Allan	C.E.1-4A1;A.E.S3-4	Oct. 11-Mar. 25
Strickland, Gerald	M.E.1-5,6	Oct. 11-Mar. 25
Strickler, Thomas David	E.E.1-4A1,4,5	July 12-Mar. 25
*Stringer, Howard Frederick	B.E.1-1	Jan. 10-
Strong, George Whitman	B.E.1-1,2	Oct. 11-Mar. 25
Struble, Edward Louis	B.E.1-1,2B,3B	July 12-Mar. 25
Struening, August Frank	B.E.1-1,2,3	July 12-Mar. 25
*Stuchell, Glen Alpho	B.E.1-1	Jan. 10-Feb. 12
Stuhl, Lee Alfred	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Stumpe, William Mann	M.E.1-4,5	Oct. 11-Mar. 25
Sturm, Robert Ivan	B.E.1-1,2	Oct. 11-Mar. 25
Sublett, George Robert	B.E.1-1,2B,3B	July 12-Mar. 25
Sullivan, Cornelius Jay	F.A.L.(F)-5	Oct. 11-Jan. 1
Sullivan, Harry Francis	C.E.1-4A1,4	July 12-Jan. 1
Sullivan, Howard Thomas	B.E.1-1,2B	Oct. 11-Mar. 4
Sullivan, Jack Robert	B.E.1-1,2	July 12-Jan. 1
Sullivan, John Francis	F.A.L.(G)-4,5,6	July 12-Mar. 25
Sumner, Wilfred Melvin	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Sundblad, Robert Leonard	M.E.1-5,6	Oct. 11-Mar. 25
Sunega, Edward Stephen	M.E.1-4	Oct. 11-Jan. 1
Supnick, Samuel Lawrence	B.E.1-1,2B	Oct. 11-Feb. 9
Sutton, Rodger Willet	B.E.1-1	July 12-Oct. 2
Svec, Charles Conrad	C.E.1-4,5	Oct. 11-Mar. 25
Sweet, Jasper Clyde, Jr.	C.E.1-4A1	July 12-Oct. 2
Swett, George Elms, Jr.	E.E.1-4	Oct. 11-Jan. 1
Symmes, Robert Woodbury	Ch.E.1-4;A.E.S1-5,6	July 12-Mar. 25
*Tacka, Melvin Blase	B.E.1-1	Jan. 10-
Talarek, Walter Michael	B.E.1-1,2	Oct. 11-Mar. 25
*Talbot, George Paul	B.E.1-1	Oct. 11-Jan. 1
Tamarin, Leon	M.E.1-4A1,4	July 12-Jan. 1
Tangeman, Dale Vincent	E.E.1-4A1	Oct. 11-Dec. 4
Tannenbaum, Bernard	B.E.1-1,2,3	July 12-Feb. 9
*Tarallo, Louis Anthony	B.E.1-1	Oct. 11-Jan. 1
Tarkoff, Seymour	B.E.1-1,2	July 12-Nov. 27
Tarpinian, Krikor	B.E.1-1,2B,3B	July 12-Mar. 25
Tate, James O.	B.E.1-1,2B,3B	July 12-Mar. 25
Tawes, William Stanley	E.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Taylor, Harold	B.E.1-1,2B,3B	July 12-Mar. 25
Taylor, James McFarland	B.E.1-1,2,3	July 12-Mar. 25
Taylor, John Purser	B.E.1-1,2B	Oct. 11-Mar.4
Taylor, Russell Earl	B.E.1-1,2B,3B	July 12-Mar. 25
Taylor, Walter Ralph	M.E.1-4,5	Oct. 11-Mar. 25
Taylorson, Peter Blair	E.E.1-4A1	Oct. 11-Jan. 1
Teichmann, Newton Nichols	M.E.1-4A1,4,5	July 12-Mar. 25
Tekirian, Allen Trimble	F.A.L.(G)-4,5,6	July 12-Mar. 25
Temple, Ralph Oscar	E.E.1-4A1,4	July 12-Dec. 4
Thigpen, George Holmes	B.E.1-1,2B	Oct. 11-Mar. 25
Thomas, Dalton Myers	B.E.1-1,2B,3B	July 12-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Thompson, Robert Donald	B.E.1-1	July 12-Aug. 26
Thompson, William Frank, Jr.	M.E.1-6	Jan. 10-Mar. 25
Thomson, Albert Harvey	B.E.-5E	Jan. 10-Feb. 14
Thomson, Robert John	B.E.1-1,2B	Oct. 11-Mar. 25
Tichy, Edwin Robert	M.E.1-4,5	Oct. 11-Mar. 25
*Tidd, Charles Edward, Jr.	B.E.1-1,2	Oct. 11-
TiHor, Julius	F.A.L.(G)-4	July 12-Oct. 2
*Tilghman, Henry Lee	B.E.1-1,2	Oct. 11-
Tilley, Harold Widdall	B.E.-5E	Jan. 10-Feb. 14
Tisdale, James Floyd	B.E.1-1,2B	Oct. 11-Feb. 9
Tomaszewski, Carl Edward	B.E.2-1,2	Oct. 11-Mar. 25
Tompkins, Elbert William, Jr.	M.E.1-4A1,4,5	July 12-Mar. 25
Topazio, Attilio Andrew	M.E.1-5,6	Oct. 11-Mar. 25
Torgerson, Robert Lane	B.E.1-1,2B,3B	July 12-Mar. 4
Tousignant, Albert Raymond	B.E.1-1	Oct. 11-Jan. 1
Trautner, William Anthony	B.E.1-1	July 12-Sept. 25
Travers, Bernard Francis, Jr.	B.E.1-1,2B,3B	July 12-Mar. 4
Tremiti, Ferdinand	F.A.L.(F)-4,5,6	July 12-Feb. 29
Trent, George Ervin, Jr.	E.E.1-4,5	Oct. 11-Mar. 25
Trotiner, Murray	E.E.1-4,5	Oct. 11-Mar. 25
Trussell, Hugh Hiram, Jr.	B.E.1-1,2B	Oct. 11-Mar. 25
*Tull, Robert Cassan	B.E.1-1,2	Oct. 11-
Turk, Irving Benjamin	B.E.1-1	Oct. 11-Jan. 1
Turman, Elbert Jerome	B.E.2-1,2	Oct. 11-Feb. 9
Turner, Francis Edward	E.E.1-4A1,4,5	July 12-Mar. 25
Turner, Irving	F.A.L.(G)-4,5,6	July 12-Feb. 29
Turner, Marion Charles	B.E.1-1	July 12-Oct. 2
Turner, Richard G., Jr.	B.E.2-1,2	Oct. 11-Mar. 4
Tuschhoff, John Vincent	M.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
*Twentey, Roy Kenneth	B.E.1-1	Jan. 10-
Tyokowski, Edward Joseph	B.E.1-1	July 12-Sept. 25
Tyner, Arthur Kerwin	F.A.L.(G)-4,5,6	July 12-Mar. 25
Uhlig, Raymond Martin	F.A.L.(G)-4,5,6	July 12-Mar. 25
Ulrich, Melvin Walter	B.E.2-1,2	Oct. 11-Mar. 25
Ummel, Otis Ray	B.E.1-1,2	July 12-Jan. 1
Ungemach, Richard Cooley	M.E.1-5,6	Oct. 11-Mar. 25
Underwood, Robert Ross	B.E.1-1,2B	July 12-Jan. 1
Unruh, James Lee	B.E.1-1,2,3	July 12-Mar. 25
*Upchurch, Stanley Hubbard, Jr.	B.E.1-1	Jan. 10-
Urschel, Edwin Dixon	B.E.1-1	July 12-Sept. 25
Useller, James Walter	M.E.1-4,5	Oct. 11-Mar. 25
Usiak, Edwin Paul	M.E.1-5,6	Oct. 11-Mar. 25
Uttermann, Ervin Edward	E.E.1-4A1,4,5	July 12-Mar. 25
Vlaika, Thomas Joseph	B.E.2-1,2	Oct. 11-Mar. 25
Vanas, Howard John	C.E.1-4,5	Oct. 11-Mar. 25
VanAuken, Harry Joseph	Ch.E.1-4A1;E.E.1-4,5	July 12-Mar. 4
VanBuren, Landin Irving	C.E.1-4,5	Oct. 11-Mar. 25
VanDerVeer, Theodore Robert	B.E.1-1,2B,3B	July 12-Mar. 25
Vasquez, Carmelo	C.E.1-4A1; A.E.S3-4	Oct 11-Mar. 25
Verno, Louis John	M.E.1-5,6	Oct. 11-Mar. 4
Vertucci, Phillip Carmine	B.E.1-1,2	Oct. 11-Mar. 4
VickRoy, Robert Lon	B.E.1-1	July 12-Oct. 2
Victor, David	E.E.1-4,5	Oct. 11-Mar. 4
Vignali, John Anthony	E.E.1-4,5	Oct. 11-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
Vimtrup, Jens P.	M.E.1-4A1	Oct. 11-Jan. 1
Vincent, George Gundelfinger	Ch.E.1-4A1; E.E.1-4,5	July 12-Mar. 4
*Vincent, John Luther	B.E.1-1	Oct. 11-Jan. 1
Vincent, William John, Jr.	B.E.1-1,2B	Oct. 11-Mar. 25
*Vishabazoon, Philip Aram	B.E.1-1	Jan. 10-
Vlahos, Charles John	M.E.1-4,5	Oct. 11-Mar. 25
Vnuk, Wallace John	B.E.1-1,2	Oct. 11-Mar. 25
Volavka, John Charles	F.A.L.(G)-4,5,6	July 12-Mar. 25
Volk, Charles Henry	E.E.1-4A1,4,5	July 12-Mar. 25
Wagner, George Adam, Jr.	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Wagner, John Conrad	B.E.1-1,2	Oct. 11-Mar. 2
Wahal, John	B.E.1-1,2B	Oct. 11-Mar. 4
Waksberg, Irving	Ch.E.1-4; A.E.S1-5,6	July 12-Mar. 25
Waldman, Joseph Meyer	B.E.1-1,2,3	July 12-Mar. 25
Walker, John Henry	M.E.1-4A1,4,5	July 12-Mar. 25
*Walker, William Washington	B.E.1-1	Jan 10-
Wall, Edward Thomas	E.E.1-5,6	Oct. 11-Mar. 25
Wallace, Robert Franklin	M.E.1-5,6	Oct. 11-Mar. 25
*Wallace, William Kelly	B.E.1-1	Oct. 11-Jan. 1
Wallace, William Noble	F.A.L.(F)-4,5,6	July 12-Mar. 25
Wallin, Robert Charles	B.E.1-1,2	Oct. 11-Mar. 4
Wallis, Charles William	B.E.1-1	Oct. 11-Dec. 8
Walsh, Edward Anthony	B.E.1-1,2B	July 12-Jan. 1
Walsh, James Maeder	B.E.1-1,2	July 12-Jan. 1
*Walsh, William Walker	B.E.1-1	Jan 10-
Walther, Kenneth Gifford	B.E.1-1	Oct. 11-Jan. 1
Walton, Carroll Robert	B.E.1-1	July 12-Aug. 26
Waltz, John William	F.A.L.(F)-4,5,6	July 12-Mar. 25
Wapner, Stanley Herbert	M.E.1-4,5	Oct. 11-Mar. 25
*Waranch, Stanley	B.E.1-1	Jan. 10-Jan. 21
Ward, Joseph Arthur, Jr.	F.A.L.(G)-4,5,6	July 12-Feb. 14
Warm, Stanley H.	B.E.2-1	Oct. 11-Jan. 1
Wasson, Jack Ferries	B.E.1-1,2B,3B	July 12-Mar. 25
Watkins, John James	B.E.1-1,2,3	July 12-Mar. 25
Watt, Daniel Webster	B.E.1-1,2B	Oct. 11-Mar. 25
Watts, James Harvey	B.E.1-1	July 12-Oct. 2
Waugaman, Edward Ralph, Jr.	B.E.1-1	Relieved, Oct. 9
Way, Kenneth E.	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Weber, Jacob Arthur	M.E.1-4	July 12-Aug. 6
Wechsler, Samuel	F.A.L.(G)-4,5,6	July 12-Feb. 16
Wedor, Cornell Leonard	B.E.1-1,2,3	July 12-Mar. 25
Weeces, Clyde Vance	B.E.1-1	Oct. 11-Dec. 3
Weidner, Clifford R.	B.E.1-1,2B	Oct. 11-Mar. 25
*Weinstock, Milton	B.E.1-1	Jan. 10-
Weinstock, Paul	B.E.2-1,2	Oct. 11-Mar. 25
*Weisman, Jerome	B.E.1-1	Jan. 10-
*Weiss, Gerald	B.E.1-1	Jan. 10-
*Weiss, Stanley Alan	B.E.1-1	Jan. 10-
*Weissberger, Sidney Jack	B.E.1-1	Oct. 11-Jan. 1
Weissman, Sydney	Ch.E.1-4A1; M.E.1-4,5	July 12-Mar. 25
Welch, Ernest LeRoy	B.E.1-1	July 12-Sept. 25
Welch, Joseph Daniel	E.E.1-5,6	Oct. 11-Mar. 25
Wellington, Roy	B.E.1-1,2,3	July 12-Mar. 25
Welshon, Donald Woodruff	B.E.1-1	July 12-Oct. 2

Name	*Curriculum and Term*	*Dates of Attendance*
Wentrcek, Roy Alfred	B.E.1-1,2	Oct. 11-Feb. 12
Wetrich, Thomas Donald	B.E.-5E	Jan. 10-Feb. 14
*Wexler, Sidney	B.E.1-1	Jan. 10-
*Weyrich, Carroll Melvin	B.E.1-1	Jan. 10-
Whalen, George Joseph	B.E.1-1,2,3	July 12-Mar. 4
Whigham, William III	M.E.1-6	Jan. 10-Feb. 14
*Whitaker, Mervin L.	B.E.1-1	Oct. 11-Jan. 1
White, Lee Calvin	E.E.1-4A1,4,5	July 12-Mar. 25
White, Maurice Philip	M.E.1-4A1,4,5	July 12-Mar. 25
White, Max Arthur	B.E.1-1	Oct. 11-Jan. 1
Whitehorn, Aaron Ely	Ch.E.1-4,5	July 12-Nov. 15
Whitman, Noel Frank	B.E.1-1,2B,3B	July 12-Mar. 25
Whitman, Robert	B.E.1-1,2B,3B	July 12-Mar. 25
Whitson, Louis Arthur	B.E.1-1,2B	Oct. 11-Mar. 25
Whittaker, Douglas Harold	B.E.1-1	Oct. 11-Dec. 21
Whittemore, John Prentiss	M.E.1-5,6	Oct. 11-Mar. 25
*Whitesman, Norman Irvin	B.E.1-1	Jan. 10-
*Whittington, David Kelsey	B.E.1-1	Jan. 10-
Widick, Branko John	F.A.L.(G)-4,5,6	July 12-Mar. 25
Wilbur, Clyde Wesley	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Wild, Joseph	M.E.1-4,5	Oct. 11-Mar. 25
Wilkins, Robert Earl	B.E.1-1,2B,3B	July 12-Mar. 25
Willard, Frederick Emmett	M.E.1-5,6	Oct. 11-Mar. 25
Willard, Francis Hugo	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
Willette, Donald Ray	Ch.E.1-4,5,6	July 12-Mar. 25
Willey, James Ernest	B.E.1-1,2B,3B	July 12-Mar. 25
William, Edward Lindsey	B.E.1-1	July 12-Oct. 2
Williams, Ernest Fennell, Jr.	B.E.1-1,2B,3B	July 12-Mar. 4
*Williams, George Christopher	B.E.1-1	Jan. 10-
*Williams, John Foreman	B.E.1-1	Jan. 10-
Williams, Lyle Arthur	M.E.1-4,5	Oct. 11-Mar. 25
Williams, Ralph B.	B.E.1-1R,1,2	July 12-Mar. 4
Willis, Ray Osborne	B.E.1-1	July 12-Oct. 2
Wilmot, William Francis	B.E.1-1	July 12-Oct. 2
Wilson, Bruce Marron	F.A.L.(F)-4,5,6	July 12-Mar. 25
Wilson, Malcolm McClintock	E.E.1-4,5	Oct. 11-Mar. 25
Winiarczyk, Edward Richard	M.E.1-4,5	Oct. 11-Mar. 25
*Wirant, John Arthur	B.E.1-1	Oct. 11-Jan. 1
Wiss, Kenneth Bertrand	B.E.-5E	Jan. 10-Feb. 14
Wiswell, Charles Moore	E.E.1-4,5	Oct. 11-Mar. 25
Wittig, Fred, Jr.	B.E.1-1,2,3	July 12-Mar. 25
Wogan, Philip Andrew	M.E.1-4A1,4,5	July 12-Mar. 25
Wolf, Henry William	F.A.L.(F)-4,5	July 12-Jan. 1
Wolfe, James Oscar	B.E.1-1,2	July 12-Jan. 1
Wolff, Perry Sidney	C.E.1-4A1,4,5	July 12-Mar. 25
Wolff, Robert Kay	M.E.1-4,5	Oct. 11-Mar. 25
*Wood, Robert Donaldson	B.E.1-1	Oct. 11-Dec. 3
Wood, Stephen Lane	B.E.1-1	Oct. 11-Dec. 13
Woodbridge, Stuart Alfred	B.E.1-1	Oct. 11-Jan. 1
Woodhull, Bradley Allen	M.E.1-4,5	Oct. 11-Mar. 25
Woodruff, Dean Garland	B.E.1-1R	July 12-Oct. 2
Woods, Robert Joyce, Jr.	M.E.1-4,5,6	July 12-Mar. 25
*Woodside, Murray Davis	B.E.1-1	Oct. 11-Dec. 3
Woodworth, Robert Kemp	E.E.1-4,5	Oct. 11-Mar. 25

Name	*Curriculum and Term*	*Dates of Attendance*
*Woolman, Richard Hulme	B.E.1-1	Jan. 10-
Woroniecki, John	B.E.1-1,2	Oct. 11-Mar. 4
Worsham, Gilbert Dwight	F.A.L.(F)-4,5,6	July 12-Mar. 25
Wortzman, Sheldon Kenneth	E.E.1-4,5	Oct. 11-Mar. 25
Wright, Maurice Eugene	E.E.1-4A1	Oct. 11-Jan. 1
Wright, Spencer Harvey	B.E.1-1,2,3	July 12-Mar. 25
Wullstein, John Herman	B.E.1-1,2B	Oct. 11-Mar. 25
Yager, Harold John	E.E.1-4A1,4,5	July 12-Mar. 25
Yerazunis, Stephen	M.E.1-5,6	Oct. 11-Mar. 25
Yetter, John Edward	C.E.1-4A1; A.E.S3-4	Oct. 11-Mar. 25
*Yingst, Harold Elton	B.E.1-1	Oct. 11-Jan. 1
Ylander, Edmond Ferril	B.E.1-1	Oct. 11-Jan. 1
Yocom, John Erwin	M.E.1-4,5	Oct. 11-Mar. 25
Young, James Clifton, Jr.	B.E.1-1	July 12-Oct. 2
Young, Russell	B.E.1-1,2B	Oct. 11-Mar. 25
Youngs, John Dutton	M.E.1-4A1,4	July 12-Jan. 1
Zander, Kenneth, Jr.	B.E.1-1,2	Oct. 11-Mar. 25
Zeidman, Sidney Ely	B.E.1-1	July 12-Oct. 2
*Zeller, Frederick	B.E.1-1	Jan. 10-
Ziebarth, Charles William	M.E.1-5,6	Oct. 11-Mar. 25
Ziemenski, Theodore John	F.A.L.(G)-4	July 12-Oct. 2
Zimbel, Norman Sumner	M.E.1-5,6	Oct. 11-Mar. 25
Zimmerman, George Albert	M.E.1-4,5	Oct. 11-Mar. 25
Zimmerman, Herman Leon	E.E.1-4,5	Oct. 11-Mar. 25
Zimny, Aloysius	F.A.L.(G)-4	July 12-Sept. 25
Zorger, William Emerson	B.E.1-1,2	Oct. 11-Mar. 25
Zucker, William Kenward, Jr.	B.E.-5E	Jan. 10-Feb. 14
Zultoski, Charles Joseph	M.E.1-4A1	July 12-Oct. 2

SUMMARY OF STUDENTS BY CLASSES AND CURRICULA

SUMMER SEMESTER, 1943

Undergraduates	Seniors	Juniors	Sophomores	Second Semester Freshmen	New Freshmen	General College Division	Special Students	Total
Arts and Science	20	12	10	8	10	....	3	63
Business Administration	14	6	4	6	5	....	....	35
Chemical Engineering	17	22	35	11	39	....	....	124
Chemistry	3	3	5	1	1	....	....	13
Civil Engineering	4	2	8	1	9	....	....	24
Electrical Engineering	17	13	11	5	20	....	....	66
Engineering	....	....	....	....	9	....	....	9
Engineering Physics	3	3	5	....	1	....	....	12
Industrial Engineering	2	1	2	....	3	....	....	8
Mechanical Engineering	24	19	27	8	41	....	....	119
Metallurgical Engineering	19	6	4	3	6	....	....	38
Mining Engineering	1	5	1	....	1	....	....	8
General College Division	....	....	....	....	....	2	....	2
Undergraduate Women	....	....	....	....	....	....	....	7
Total	124	92	112	43	145	2	3	528

FALL SEMESTER, 1943-44

Undergraduates	Seniors	Juniors	Sophomores	Second Semester Freshmen	New Freshmen	General College Division	Special Students	Total
Arts and Science	21	5	13	10	7	....	1	57
Business Administration	6	3	11	5	3	....	....	28
Chemical Engineering	14	19	33	32	5	....	....	103
Chemistry	3	1	4	1	1	....	...	10
Civil Engineering	3	5	5	4	2	....	....	19
Electrical Engineering	16	10	14	17	8	....	....	65
Engineering	....	....	....	5	2	....	....	7
Engineering Physics	5	....	5	2	1	....	....	13
Industrial Engineering	1	1	4	2	2	....	....	10
Mechanical Engineering	26	17	27	30	19	....	....	119
Metallurgical Engineering	13	4	6	4	1	....	....	28
Mining Engineering	1	5	1	1	....	....	....	8
General College Division	....	....	....	....	....	5	....	5
Total	109	70	123	113	51	5	1	472

Exclusive of 97 A.S.T.P.-R.O.T.C. Students under government contract.

SPRING SEMESTER, 1943-44

Undergraduates	Seniors	Juniors	Sophomores	Second Semester Freshmen	New Freshmen	General College Division	Special Students	Total
Arts and Science	9	3	14	4	4	....	3	37
Business Administration	8	7	7	4	1	....	....	27
Chemical Engineering	21	25	28	4	2	....	....	80
Chemistry	3	4	1	1	1	....	....	10
Civil Engineering	3	5	3	1	2	....	....	14
Electrical Engineering	13	11	17	7	9	....	....	57
Engineering	....	....	....	2	....	....	....	2
Engineering Physics	3	5	2	1	2	....	....	13
Industrial Engineering	2	2	3	1	3	....	....	11
Mechanical Engineering	16	20	25	14	6	....	....	81
Metallurgical Engineering	7	3	3	1	....	....	....	14
Mining Engineering	4	1	1	....	....	....	....	6
General College Division	....	....	....	....	....	10	....	10
Total	89	86	104	40	30	10	3	362

Graduate Students (3 semesters, less duplications)	131
Undergraduate Students (3 semesters, less duplications)	790
Students in Pre-Session	154
Students in Summer Sessions	68
Total	1143
Total, less duplications	1009

GEOGRAPHICAL DISTRIBUTION OF STUDENTS, 1943-44

California	2
Colorado	2
Connecticut	9
Delaware	9
District of Columbia	8
Florida	3
Georgia	2
Illinois	4
Indiana	1
Kentucky	1
Maine	2
Maryland	21
Massachusetts	4
Michigan	4
Minnesota	1
Mississippi	1
New Jersey	163
New York	142
North Carolina	1
Ohio	8
Oklahoma	2
Pennsylvania	590
Rhode Island	1
South Carolina	3
Texas	1
Virginia	6
West Virginia	4
Wisconsin	1
Canada	1
China	2
Colombia	1
Cuba	1
Hawaii	1
Peru	2
Puerto Rico	1
Scotland	1
Venezuela	3
	1009

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